VIII. Tieton LSR, Russell Ridge and Lost Lake MLSA

A. General Description of LSR

This portion of the document describes the vegetation, wildlife, aquatic resources and human uses associated with this LSR.

1. Vegetation

This section describes the current condition of vegetation groups (see Chapter II, Vegetative Landscape) within the Tieton LSR, Lost Lake and Russell Ridge MLSAs. Data was derived by a combination of aerial photo interpretation, stand exam information, and field validation (see Chapter II, Vegetative Landscape). It should be noted that site specific information regarding vegetation structure and distribution will need to be updated as restoration projects are initiated. The vegetation layer developed for this analysis serves as a starting point only.

Information is provided below regarding each vegetation group. More detailed information relative to the Tieton LSR, Lost Lake and Russell Ridge MLSAs can be found in the Tieton Watershed Assessment.

a) Dry Forest Group

Ten percent (4,180 acres) of the Tieton LSR, 54 percent (3,717 acres) of the Lost Lake MLSA, and 44 percent (5,423 acres) of the Russell Ridge MLSA consists of the dry forest group. Within this group, in the Tieton LSR, 75 percent (3,131 acres) is mapped as high density, ten percent (418 acres) as created openings, eight percent (317 acres) as partial cut, and seven percent (314 acres) as low density.

In the Lost Lake MLSA, 85 percent (3,156 acres) is mapped as high density, 12 percent (434 acres) as created opening, and three percent (127 acres) as partial cut. Relative to the Russell Ridge MLSA, 75 percent (4,048 acres) is mapped as high density, 13 percent (703 acres) as partial cut, 12 percent (659 acres) as created openings, and less than one percent (13 acres) as low density.

In all LSR/MLSAs the dry forest group is comprised of a mix of Douglas-fir and dry grand fir series with the dry grand fir series predominate. Commonly, ponderosa pine and Douglas-fir exist as the overstory dominates. The understory vegetation most often consists of a grass/forb mix, generally dominated by *Calamogrostis rubesscens* and *Carex geyeri*. *Luina nardossama* and *Lupinus* spp. are generally well represented as a forb associates. Within these areas, the dry vegetation group is associated primarily with southerly aspects.

b) Moist Grand Fir Group/Mesic Western Hemlock

Approximately 44 percent (17,530 acres) of the Tieton LSR supports moist grand fir or mesic western hemlock plant communities. The majority, or 73 percent (12,855 acres) of this forest group is currently layered and/or mature (mid- to late-successional). Created openings comprise approximately 11 percent (1,990 acres) of this group (Appendix 5). Partial cut comprises nine percent (1,569 acres) of the area. The remaining seven percent (1,116 acres) is comprised of single-layered stands.

Relative to the Lost Lake MLSA, 27 percent (1,897 acres) of the area supports moist grand fir plant associations. Approximately 1,676 acres (88 percent) is mapped as layered and/or mature. Created opening comprise nine percent (170 acres) of the area. Three percent (48 acres) of the

area is of partial cut stands, and less than one percent (3 acres) is mapped as single-layered stands.

Relative to the Russell Ridge MLSA, 25 percent (3,130 acres) is mapped as moist grand fir plant associations. Layered and/or mature stands make up 68 percent (2,114 acres) of the area. Created opening comprise 18 percent (578 acres), and partial cuts, 14 percent (438 acres) of the moist grand fir vegetation group.

Within the Tieton LSR, moist grand fir occurs on all aspects except the north aspect; which is occupied by the mesic western hemlock series. In the Lost Lake and Russell Ridge MLSAs, all aspects are occupied by the moist grand fir series. This vegetation distribution is due to either the lack of northerly aspects in the Russell Ridge MLSA and the more eastern location, and thus, reduced precipitation associated with the Lost Lake and Russell Ridge MLSAs. Increasing elevation results in the development of the wet forest vegetation group dominated by the silver fir, mountain hemlock, and to a lesser extent, subalpine fir series. Species composition in the moist grand fir and western hemlock types consists largely of, *Berberis nevadensis*, *Achlys triphylla*, *Clintonia uniflora, Linnaea borealis* and *Chimaphila umbellatta.* In gaps and more open areas within the forest, *Lupinus* and *Vaccinium* species become dominate understory associates.

c) Subalpine Fir Series

In the Tieton LSR, Lost Lake and Russell Ridge MLSAs, the subalpine fir series is limited in it's distribution, occurring on high elevation, dry sites. This series is located primarily along Bethel and Divide Ridges. In the Tieton LSR, ten percent (4,077 acres) of the area supports this vegetation group. Of this total, 93 percent (3,793 acres) is mapped as layered and/or mature stands. Six percent (229 acres) is mapped as created openings, with the remaining one percent (56 acres) mapped as single layered stands. In the Lost Lake and Russell Ridge MLSAs, one pecent (59 acres) and three percent (424 acres), respectively, are occupied by subalpine fir plant associations. All of this vegetation group in these MLSAs is mapped as layered and/or mature.

Subalpine fir is the most widespread species within the overstory of this series (Wenatchee National Forest, Ecology Plot Database). Common seral dominates include Douglas-fir, lodgepole pine. Engelmann spruce, and western larch. Understory composition is commonly lush with species such as *Valeriana sitchensis, Lupinus polyphyllus, Lupinus latifolius*, and *Calamagrostis rubescens. Arnica latifolia, Carex* spp., and *Luzula hitchcockii* are often dominate herb spsecies. These communities may also be shrub dominated with common species such *as Rhododendron albiflorm, Vaccinium myrtillus, Vaccinium membranaceum, Vaccinium scoparium, Rubus lassiococcus, Chimaphila umbellata, Pachistima myrsinites, Pyrola* spp., and *Sorbus sitchensis.* Subordinate community associates may include *Polemonium pulcherrimum, Pedicularis racemosa,* and *Elymus glaucus.*

d) Wet Forest Group

The wet forest vegetation group is supported only within the Tieton LSR and Russell Ridge MLSA. This vegetation group constitutes 21 percent (8,251 acres) and 14 percent (1,721 acres) of these areas, respectively. In the Tieton LSR, 82 percent (6,723 acres) is mapped as layered and/or mature stands. Created openings comprise 11 percent (935 acres) of the area., four percent (320 acres) is of riparian forest, with the remaining three percent (273 acres) as single layered. stands. In the Russell Ridge MLSA, 84 percent (1,454 acres) is mapped as layer and/or mature, with the remaining 16 percent (267 acres) being created openings. Riparian forest is isolated primarily along the North Fork Tieton River, Clear Creek and Indian Creek.

In the wet forest group, tree overstory composition is generally dominated by mountain hemlock, Pacific silver fir, and subalpine fir. Western larch, Douglas-fir, lodgepole pine, and whitepine are present as primary seral dominants. Undergrowth composition may vary from relatively lush and dense to scarce. The shrub component of these communities typically includes, *Rubus lassiococcus, Vaccinium* spp., *Ribes viscosissimum, Pyrola* spp., *Lutkea pectinata,* and *Xerophyllum tenax.* Associate herbs include *Luzula hitchocockii, Arnica latifolia, Achlys triphylla, Clintonia uniflora,* and *Polemonium pulcherrimum.*

e) Whitebark Pine Group

Whitebark pine is supported only within the Tieton LSR. Approximately one percent (319 acres) of the LSR is of this vegetation group. These stands occur as multiple layered stands distributed in a park-like arrangement. They are located along the highest elevations of Divide Ridge and west of Section 3 Lake. Predominate understory species include *Juniperis communis, Luzula hitchcockii,* and *Festuca viridula.*

f) Non-Forest Vegetation

There are approximately 5,641 acres (14 percent) of non-forest vegetation within the Tieton LSR. Included in this group are: talus (2,982 acres), grassland/shrubland (821acres), bedrock (731 acres), wet meadow (318 acres), cliff (277 acres), scree (255 acres), deciduous forest (141 acres), water (68 acres), and dry meadow (48 acres).

The Lost Lake MLSA supports approximately 1,273 acres (18 percent) of non-forest vegetation. Included within this group are: bedrock (469 acres), talus (321 acres), grassland/shrubland (177acres), wet meadow (104 acres), deciduous forest (100 acres), dry meadow (56 acres), water (25 acres), and cliff (22 acres).

The Russell Ridge MLSA supports approximately 1,637 acres (13 percent) of non-forest vegetation. Included within this group are: talus (559 acres), bedrock (534 acres), grassland/shrubland (242 acres), water (108 acres), cliff (71 acres), wet meadow (67 acres), dry meadow (35 acres), deciduous forest (10 acres), and brushfield (10 acres).

g) Noxious Weeds

Portions of the Tieton LSR, Lost Lake and Russell Ridge MLSAs have been surveyed for noxious weed species that occur along roadsides and in areas previously harvested. High densities of *Centaurea diffusa* are present along roads, particularly Highway 12 and major Forest Service Roads (Roads 1500, 1306, 1200, 1201and 1000). *Centaurea maculosa* is present adjacent to the Russell Ridge MLSA in the vicinity of the White Pass Work Center. Other species within or threatening the Tieton LSR, Lost Lake and /or the Russell Ridge MLSA include: *Chrysanthemum leucanthemum, Hypericum perforatum, Senecio jacobaea, Hypochaeris radiata, Cirsium arvense,* and *Cirsium canadensis. Linaria dalmatica* is becoming established adjacent to these areas, primarily road shoulders and waste places along Highway 12. *Cystis scoparium* has been observed occasionally along Highway 12. *Verbascum thapsus* and *Convolvulus arvense* occur in the vicinity of the LSR/MLSAs as infrequent isolated patches. There is a severe infestation of *Chicorum intybus* adjacent to the Russell Ridge MLSA. This species is becoming established within the MLSA and threatens the integrity of the existing vegetative communities in this area. Surveys for species presence and extent should be completed in order to develop a noxious management plan for these areas (refer to Harrod 1994).

2. Late Successional Associated Wildlife Species

a) Tieton LSR and Lost Lake MLSA

(1) Introduction

In this section, information is presented about wildlife species that are associated with the late-successional habitats that are either present or would be managed for in the Tieton LSR and the Lost Lake MLSA. A total of 80 species have been identified as being associated with these kinds of forest conditions and are present, unknown or suspected to occur within these areas. The list of these species can be found in Appendix 27.

In addition to consideration for the groups of species associated with the various kinds of late-successional forests, individual species assessments were also conducted. These assessments were completed for all threatened, endangered, sensitive, species of concern (USFWS), management indicator, protection and buffer, and survey and manage species. Collectively this group of species is referred to as species of special status. What information is available about the status of these species within the Tieton LSR and Lost Lake MLSA is summarized in this chapter. However, relatively little is known about a number of them.

Inventories or surveys have been conducted for only a few of the wildlife as shown in Appendix 27. The most extensive of these were for the bald eagle, peregrine falcon and spotted owls. Northern spotted owl inventories have been conducted on 100% of the suitable habitat within the Tieton LSR and 30 % of the Lost Lake MLSA.

(2) Late Successional Species By Habitat Type

(a) Dry Forests

Four thousand one hundred and eighty acres (10 %) of the Tieton LSR and 3,717 acres (85 %) of the Lost Lake MLSA are composed of the dry forest vegetation group. Fire climax ponderosa pine forests historically dominated these areas and 49 wildlife species are associated with these forests.

Currently, 3,131 acres (75%) of Tieton LSR and 3,156 acres (85%) of Lost Lake MLSA are in a successionally advanced condition. Tieton LSR has 314 acres (7.5 %) that are in a low density condition and could be fire-climax.

Some species that are associated with the late successional or fire-climax conditions of these forests and that have special management status include: tailed frog, larch mountain salamander, northern goshawk, bald eagle, flammulated owl, pileated woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, northern flicker, chestnut backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, silver haired bat, fringed myotis, western big-eared bat, pallid bat, marten, and fisher.

Historically, only a minor portion of these areas provided the structures that are associated with suitable spotted owl habitat (Thomas et al. 1990, Buchanan et al. 1995). However, fire exclusion has allowed successional advancement for suitable spotted owl habitat to develop in some areas (Agee and Edmunds 1992, Buchanan et al. 1995). These areas are now being used by spotted owls, however the risk of large scale disturbances causing large scale habitat loss is of major concern (Agee and Edmunds 1992, Buchanan et al. 1995, Gaines et al. in press). One known spotted owl activity center occurs in this vegetation group in the Tieton LSR.

(b) Moist Grand Fir Group

The Moist Grand Fir group covers about 17,530 acres (44%) of the Tieton LSR and 1,897 (27%) of the Lost Lake MLSA. Historically, fire occurred less frequently than in the Dry and Mesic vegetation groups (refer to Chapter III), allowing successional advancement and complex habitat structure such

as high crown closure, multilayering, and many snags and down logs. These conditions provide habitat for a wide array of wildlife species, including 73 species within the Icicle LSR.

Currently, about 12,855 acres (73%) of the Moist Grand Fir group in the Tieton LSR is in a late-successional condition and 1,676 acres (88%) of the Moist Grand Fir in the Lost Lake MLSA is in a late-successional condition. In the absence of any major disturbance, it is expected that in 50 years 13,971 acres (80%), and in 100 years 17,530 acres (100%) of this habitat would be in a late-successional condition in the Tieton LSR. In the Lost Lake MLSA it is expected that in 50 years 1,679 acres (89%), and in 100 years 1,897 acres (100%) would be in a late-successional condition, assuming no large scale disturbance.

Wildlife species associated with the late-successional conditions of this vegetation group and of special status include the northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten and fisher.

The Moist Grand Fir vegetation group is capable of providing structures that compose suitable spotted owl nesting, roosting, and foraging habitat while remaining within the range of historic variability. One spotted owl activity center located within the Lost Lake MLSA occurs in this vegetation type. A total of 12 spotted owl activity centers occur within the Moist Grand Fir and Wet Forest groups in the Tieton LSR.

(c) Wet Forest Group

The Wet Forest Group covers about 8,251 acres (21%) of the Tieton LSR. Historically fire occurred relatively infrequently (refer to Chapter III) allowing for succession to result in complex forest structures such as high crown closure, multilayering, and high numbers of snags and down logs. These conditions provide habitat for about 54 species that are associated with the late-successional conditions of these forests.

Currently, 6,723 acres (81%) are in a late-successional condition in the Tieton LSR. In the absence of any large scale disturbances in 50 years 6,985 acres (85%) would be in a late-successional condition, and in 100 years 7,920 acres (96%) would be late-successional within the Tieton LSR.

Wildlife species that are associated with the late-successional conditions of this vegetation group and are of special status include northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, Warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten, and fisher.

The Wet Forest Group is capable of providing structure that composes suitable spotted owl nesting, roosting and foraging habitat while remaining within the historic range of variability. Twelve known spotted owl activity centers are located within this vegetation group and in the Moist Grand Fir within the Tieton LSR.

(d) Subalpine Fir

Subalpine Fir covers 4,077 acres (10 %) of the Tieton LSR and 59 acres (1 %) of the Lost Lake MLSA. Historically, fire frequency was relatively low but when fires did occur they were of high intensity. The longer fire return interval allowed for successional advancement that resulted in complex habitat structure such as high canopy closure, high numbers of snags and down logs. Landscape pattern was historically highly variable with a mosaic of seral stages providing habitat for a variety of wildlife species. About 41 wildlife species within the LSR are associated with the late-successional conditions of these forests.

Currently, 3,793 acres (93%) of the Subalpine Fir forests are in a late-successional condition within the Tieton LSR. In the absence of any large scale disturbance within 50 years 3,847 acres (94 %) would be in late successional condition and in 100 years 4,076 acres (100 %) would be in late successional condition within the Tieton LSR. In the Lost Lake MLSA there are 59 acres (100 %) of Subalpine Fir forest in late successional condition.

Wildlife species that are associated with the late-successional forest in this vegetation group and have special status include the tailed frog, Cascades frog, larch mountain salamander, northern goshawk, bald eagle, northern spotted owl, great gray owl, pileated woodpecker, downy woodpecker, hairy woodpecker, black-backed woodpecker, three-toed woodpecker, Williamson's sapsucker, little willow flycatcher, olive-sided flycatcher, pygmy nuthatch, long-eared myotis, Yuma myotis, lynx, and marten.

Spotted owls occasionally use these forests, however, usually they only provide foraging habitat.

(3) Species Specific Information

The information presented in this section provides an overview of what is known about the species identified in Appendix 27 as species of special status. Information is provided on a species by species basis whenever it is available.

(a) Endangered Or Threatened Wildlife Species

There are five wildlife species and three Critical Habitat Units that are federally listed as Threatened or Endangered and could occur within the Tieton LSR and Lost Lake MLSA. These include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*) and portions of Critical Habitat Units WA-17 and WA-18 for spotted owls.

The bald eagle is known to occur in the Tieton LSR and 100 % of its habitat has been surveyed. It is suspected to occur in the Lost Lake MLSA. No habitat has been surveyed. It is known that peregrine falcons occur in both the Lost Lake MLSA and Tieton LSR. One hundred percent of their habitat has been surveyed in Lost Lake MLSA and 5 % in Tieton LSR.

(b) Northern Spotted Owls

Overall, there are 13 pairs of spotted owls in the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA. A total of 10 spotted owl activity centers occur within the Tieton LSR, with an additional 4 sites that are immediately adjacent to the boundary. The Lost Lake MLSA has 1 owl activity center. The Russell Ridge MLSA has 2 spotted owl activity centers. The Russell Ridge MLSA includes portions of the William O. Douglas Wilderness, which contributes some of the best quality habitat in the MLSA.

The Tieton LSR primarily has wetter forest types, (wet, moist and multi-story subalpine fir forests). The western and northern boundaries of the Tieton LSR adjoin the Goat Rocks Wilderness and the

W.O.D. Wilderness. The wilderness habitat has a lot of contiguous forest structure, and is essential to the functioning of these LSR/MLSAs. The Tieton LSR adjoins the Yakama Indian Reservation in the south portion, along South Fork Tieton and Divide Ridge. Yakama Tribal lands include important spotted owl sites and habitat. Adjoining the eastern edges of the Lost Lake MLSA and the Tieton LSR are DNR lands, Ahtanum Unit.

The Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA was established to provide essential inter- and intra-provincial linkage for spotted owls. This connectivity is across the Cascade crest, and from north to south in the eastern Cascades. Linkage to the Yakama Tribal lands to the south, Gifford Pinchot National Forest to the west, and LSR/MLSAs to the north on the Wenatchee National Forest. These units are important to the range wide distribution for the northern spotted owl.

Within the Tieton LSR 100%, Lost Lake MLSA 30%, Russell Ridge MLSA 100% of the spotted owl habitat has been surveyed for spotted owls.

The estimated amount of habitat within a 1.8 mile radius of the activity centers is shown in Table 1? "Spotted Owl Information for Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA". For the Tieton LSR, none of the spotted owl home ranges are below threshold acres of 2,663 acres nesting/roosting/foraging habitat. There are 5 owl sites above threshold acreage's. There are 5 owl sites above target acreage (3,994 acres per site). The Lost MLSA one spotted owl site is above threshold acreage. The Russell Ridge MLSA has two owl sites, they are both below threshold acreage of 2,663 acres/1.8 mile radius of owl center AND 500 acres/0.7 miles radius. See appendix 12 "Spotted Owl Activity Centers, Reproductive Status and Habitat Availability" and 12a (owl sites from 1996 field data).

Table VIII-1, Spotted Owl Information for Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA (1996 field season)

Spotted Owl Tieton	Repro Status[3]	Owner ship[4]	Dry or Wetter Owl[5]	Threshold[6]	Critical Habitat Unit (CHU)	Forest Inter-ior?[8]	Existing SSOH 1.8 mi Radius & 0.7 mi R[10]	Activity Center 100 Ac[11]	Total Dispersal Habitat[9]
SO800[1]	PY	FS	Wetter	At Threshold	WA-18[7]	No	3337 ac in 1.8 646 ac in 0.7	190 ac w/n 0.33	1195 ac 1.8
SO802	PY	FS	Wetter	Optimum	WA-17	Inside	4,105 in 1.8mi 735 in 0.7 mi	183 ac	382 ac 1.8
SO809	PY	FS	Wetter	Optimum	WA-17	Inside	4900 in 1.8mi 867 in 0.7	217 ac	177 ac 1.8
SO812	PY	FS	Wetter	At Threshold	WA-17	Near	3598 in 1.8mi 629 in 0.7 mi.	154 ac	183 ac 1.8
SO819[1]	PY	FS	Wetter	At Threshold	WA-18[7]	Inside	3226 in 1.8mi 658 in 0.7 mi.	208 ac	1751 ac 1.8
SO828	PY	FS	Wetter	At Threshold	WA-18[7]	Near	3237 in 1.8mi 592 in 0.7 mi.	162 ac	569 ac 1.8
SO834[1]	PY	FS	Wetter	At Threshold	WA-17[7]	No	3350 in 1.8mi 519 ac in 0.7	69 ac w/n 0.33 mi	841 ac 1.8
SO835	PY	FS	Wetter	At Threshold	WA-18[7]	Inside	2970 in 1.8mi. 530 in 0.7 mi.	167 ac	1000 ac 1.8
SO 837	PY	FS	Wetter	Optimum	WA-17	Inside	4831 in 1.8mi. 808 in 0.7 mi.	187 ac	71 ac 1.8
SO841	P	FS	Dry	At Threshold	WA-17	Near	3072 in 1.8mi. 100% FS 531 in 0.7 mi.	117 ac	504 ac 1.8
SO855	PY	FS	Wetter	Optimum	None	Near	5049 in 1.8mi 808 in 0.7 mi.	185 ac	81 ac 1.8
SO870	PY	FS	Wetter	Optimum	WA-17	Near	4174 in 1.8mi	148 ac	384 ac 1.8

Spotted Owl Tieton	Repro Status[3]	Owner ship[4]	Dry or Wetter Owl[5]	Threshold[6]	Critical Habitat Unit (CHU)	Forest Inter-ior?[8]	Existing SSOH 1.8 mi Radius & 0.7 mi R[10]	Activity Center 100 Ac[11]	Total Dispersal Habitat[9]
							690 in 0.7 mi.		
SO882	PY	FS	Wetter	At Threshold	WA-18	Near	2886 in 1.8mi. 538 in 0.7 mi.	121 ac	363 ac 1.8
SO 888[1]	PY	FS	Wetter	At Threshold	WA-18[7]	Near	3698 in 1.8mi. 656 in 0.7 mi.	194 ac	1451 ac 1.8.
Historic s.owls									
unk									
Spotted Owl Lost Lk	**Repro Status[3]**	**Owner ship[4]**	**Dry or Wetter Owl[5]**	**Threshold[6]**	**Critical Habitat Unit (CHU)**	**Forest Inter-ior?[8]**	**Existing SSOH 1.8 mi Radius & 0.7 mi R[10]**	**Activity Center 100 Ac[11]**	**Total Dispersal Habitat[9]**
SO 807	PY	FS	Wetter	At Threshold	WA-17[7]	Near	2920 in 1.8mi. 542 in 0.7 mi.	147 ac w/n 0.33 mi	545 ac 1.8
Spotted Owl Russell	**Repro Status[3]**	**Owner ship[4]**	**Dry or Wetter Owl[5]**	**Threshold[6]**	**Critical Habitat Unit (CHU)**	**Forest Inter-ior?[8]**	**Existing SSOH 1.8 mi Radius & 0.7 mi R[10]**	**Activity Center 100 Ac[11]**	**Total Dispersal Habitat[9]**
SO831	PY	FS	Wetter	Below Threshold	None	Near	2917 ac in 1.8 393 ac in 0.7	83 ac w/n 0.3 mi	643 ac 1.8
SO864	PY	FS	Dry	Below Threshold	None	No	2438 ac in 1.8 371 ac in 0.7	127 ac w/n 0.33 mi	339 ac 1.8

[1] **Activity Center is Near the LSR or MLSA, but not inside the LSR or MLSA map boundary (< 1/4 mile).**

[3] RS = Residential Single; **P** = Pair; **PY** = Pair with Young, based on **highest Reproductive occupancy**. (**HS** = Historical Single)

[4] FS = Forest Service; PVT = Private Ownership (**ownership** at activity center).

[5] If the majority of suitable spotted owl habitat in **0.7 mile circle** is dry or mesic forest groups, then it is a "dry" spotted owl. If the majority is wetter forest groups, then it is a "wetter" spotted owl..

[6] **Below Threshold**: < 2,663 total suitable spotted owl habitat acres in 1.8 mile circle **OR** < 500 total suitable spotted owl habitat acres in 0.7 mile circle.

At Threshold: 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

Optimum/Target: > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

[7] The activity center is within 1/2 mile of the **CHU.**

[8] **Inside** = activity center is at least 600' inside (forest interior) late successional habitat.

Near = activity center is inside late successional habitat that creates a forest interior.

[9] **Dispersal Habitat** within 1.8 mile circle around activity center. **Dry** dispersal habitat includes vegetation codes 11, 13, and 52; **mesic** dispersal includes code 21; and **wet** dispersal includes codes 31, 35, 61, and 41.

[10] **SSOH Habitat** within 1.8 mile radius (home range) and 0.7 mile radius (Core Area). **Dry suitable spotted owl habitat** includes vegetation code 12 where size/structure is multistory greater than 9" DBH; **mesic** Suitable includes code 22; and **wetter** Suitable includes codes 32, 36, 62, 64, and 42 (see appendix 2 GIS Veg Model & appendix 3 Veg Photo Mapping Key). Use the highest quality habitat available.

[11] A larger circle than 1/3 mile radius will be used to develop **100 Acre Activity Center**, if there is less than 100 acres of suitable habitat.

(c) Critical Habitat Unit for Northern Spotted Owls

There are two Critical Habitat Units (CHU) , WA-17 and WA 18, for spotted owls overlapping into the Tieton LSR and the Lost Lake MLSA. There are no CHUs in Russell Ridge MLSA. The two CHUs provide essential habitat for inter- and intra-provincial distribution, breeding and genetic interchange. They connect to habitat to the west across the Cascade crest, and to the south into the Yakama Tribal lands, and to the north. These CHUs are important for range-wide distribution.

The CHUs cover much of the Tieton LSR and most of the Lost Lake MLSA. Combined, the CHUs goal is to support 7+ pairs of owls in the Tieton LSR/Lost Lake MLSA portions of the CHU. Currently there are 8 pairs within the CHUs and 6 more pairs very close to the CHU boundary. See Table 1?, "Spotted Owl Information", Table 2?, "LSR Connectivity", Appendix 13: "LSR/MLSA S.Owl Acreage's", Appendix 12 & 12a "Spotted Owl Activity Centers etc.", and Appendix 34: "CHU Maps Wenatchee National Forest". (USFWS Memorandum, 1991).

The WA-17 (Rimrock) CHU covers Lost Lake MLSA and the eastern part of the Tieton LSR, it should support 5+ pairs of spotted owls (4+ pairs in Tieton LSR and 1 pair in Lost Lake MLSA). Currently the Tieton portion of the CHU has 6 pairs of spotted owls, and one additional spotted owl very close to the boundary. The Lost Lake portion of the CHU has one owl pair nearby. The Rimrock CHU WA-17 was established to provide significant habitat connectivity and genetic interchange in the sub-province. This ties the Yakama Indian Reservation to the north eastern habitat on the Wenatchee National Forest and to the north western habitat on the Gifford Pinchot.

WA-18 (N.Fk Tieton).CHU covers the northwest portion of the Tieton LSR, it should support 2+ pairs of spotted owls. Currently there are 2 pairs of spotted owls, with another 5 pairs very close to the boundary. The North Fork Tieton CHU was established to provide important inter-provincial connectivity between the Wenatchee National Forest habitat and the Gifford Pinchot National Forest habitat. Connectivity is especially prevalent from the Yakama Reservation to the Tieton, and through Clear Creek into the Clear Fork of the Cowlitz on the Gifford Pinchot.

These CHUs in the Tieton LSR and Lost Lake MLSA are in good condition towards meeting the spotted owl goals. The adjacent forested habitats of the Goat Rocks and W.O. Douglas Wilderness areas are important for the functioning of the spotted owl habitat and inter/intra-provincial connectivity. Specifically North Fork Tieton, North Fork Clear Creek, Indian Creek, and Rattlesnake Meadows.

In all LSR/MLSAs, except the Swauk LSR, Shady Pass LSR, Deadhorse LSR, Boundary Butte LSR, Tumwater MLSA and Sand MLSA, these reserves are predicted to provide the needs for spotted owl recovery over time (50+ years). They will also provide the function the CHUs were designated for. Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. These reserves function for connectivity and spotted owl home ranges. It is concluded that the LSR/MLSAs meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing.

(d) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within either of these areas (Almack et al. 1993). Grizzly bears are suspected to occur in Tieton LSR and Lost Lake MLSA and none of their available habitat has been surveyed. Gray wolves are suspected to occur within the Tieton LSR and Lost Lake MLSA. No surveys have been conducted.

(e) Marbled Murrelet

The Tieton/Lost Lake/Russell Ridge LSR/MLSAs are outside of the 55 mile marine foraging zone for marbled murrelets. It is not expected that marbled murrelets would be located this far from marine foraging.

(f) Sensitive Wildlife Species and Species of Concern

There are 15 wildlife species that are on the R6 Sensitive Species list or are USFWS species of concern that could occur within the Tieton LSR and Lost Lake MLSA. These include the goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed *frog (Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascades frog (*Rana cascadae*), Columbia pebblesnail (*Fluminicola columbiana*), long-legged myotis (*Myotis volans*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanoides*), Yuma myotis (*Myotis yumanensis*), Western big-eared bat (*Plecotus townsendii*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), and wolverine (*Gulo gulo*).

(i) Birds

The goshawk is known to occur in both areas. No surveys have been completed. It is known that the little willow flycatcher and olive sided flycatcher occur in the Tieton LSR. They are suspected in the Lost Lake MLSA. No surveys have been conducted.

(ii) Amphibians

Surveys for amphibians have been completed on about 40% of the habitat within the Tieton LSR. No surveys have been conducted in the Lost Lake MLSA. It is known that the spotted frog and Cascades frog occur in both areas. The tailed frog is known to occur in the Tieton LSR and unknown in the Lost Lake MLSA.

(iii) Mollusks

No surveys for the Columbia pebblesnail have been conducted and it is unknown if they are present.

(iv) Mammals

Surveys for bat species have been not conducted. It is unknown or suspected that the long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis or the western big-eared bat occur in these areas.

Surveys for lynx, fisher and wolverine have not been conducted. Lynx are suspected in Tieton LSR and unknown in Lost Lake MLSA. Fisher are suspected to occur in the Lost Lake MLSA and known to occur in the Tieton LSR. Wolverine are known to occur in Tieton LSR and suspected in Lost Lake MLSA.

(g) Management Indicator Species

There are 12 wildlife species that are listed as management indicator species that occur or could occur within the Tieton LSR or the Lost Lake MLSA. These species include the pileated woodpecker (Dryocopus pileatus), downy woodpecker (Picoides pubescens), hairy woodpecker (Picoides villosus), three-toed woodpecker (Picoides tridactylus), red-breasted sapsucker (Sphyrapicua ruber), Williamson's sapsucker (Sphyrapicua thyroideus), northern flicker (Colaptes auratus), ruffed grouse (Bonasa umbellus), mule deer (Odocoileus hemnionus), elk (Cervus elephus), beaver (Castor canadensis), and marten (Martes americana).

(h) Primary Cavity Excavators

No surveys for primary cavity excavators have been completed in either area. All the primary cavity excavators are known in the Tieton LSR. The downy woodpecker , pileated woodpecker and northern

flicker are known in the Lost Lake MLSA. The hairy woodpecker, three-toed woodpecker, redbreasted sapsucker and Williamson's sapsucker are suspected in Lost Lake MLSA.

(i) Ruffed Grouse and Beaver

Surveys for the ruffed grouse have not been conducted on the available habitat in the Lost Lake MLSA or the Tieton LSR. They are known to occur in both areas. Surveys for beavers have not been conducted. They are suspected to occur in the Lost Lake MLSA and known to occur in the Tieton LSR.

(ii) Mule Deer, Elk

Surveys for mule deer and elk have not been completed and they are known to occur within both areas.

(iii) Marten

It is known that marten occur in the Lost Lake MLSA and the Tieton LSR. No surveys have been conducted.

(i) Survey And Manage, Protection And Buffer Species

There are eight species that do or could occur within the Tieton LSR or the Lost Lake MLSA and are identified as survey and manage, or protection and buffer species. These include the great gray owl (Strix nebulosa), flammulated owl (Otis flammeolus), White-headed woodpecker (Picoides albolarvatus), black-backed woodpecker (Picoides arcticus), pygmy nuthatch (Sitta pygmaea), warty jumping slug (Hemphillia glandulosa), blue-gray tail-dropper (Prophysaon cerulean), and papillose tail-dropper (Prophysaon dubium).

(i) Birds

The great gray owl is suspected to occur in both Lost Lake MLSA and in Tieton LSR and surveys have not been completed. No surveys have been completed for the flammulated owl and it is known that they occur in Tieton LSR and suspected in Lost Lake MLSA. The white-headed woodpecker is known to occur in both areas. The black-backed woodpecker and pygmy nuthatch are known in the Tieton LSR and suspected to occur in the Lost Lake MLSA.

(ii) Mollusks

It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the Tieton LSR and Lost Lake MLSA. No surveys have been conducted.

(iii) Habitat Effectiveness

Habitat effectiveness was measured using the current open road density and the amount of security habitat. The current open road density within the Tieton LSR is 2.5 mi./sq.mi. and the amount of area in security habitat is 16%. This information shows that habitat effectiveness is considered to be "high" (>2 mi./sq.mi.) relative to roads and "low" relative to security habitat (<50%). In the Lost Lake MLSA the current open road density is 2.6 and the area within security habitat is 18%. This information shows that the habitat effectiveness relative to road density is "high" (>2 mi./sq.mi.) and relative to security habitat is "low" (<50%). The long term management objective for LSR/MLSAs is to manage towards a "high" level of habitat effectiveness defined as >1mi./sq.mi. open road density and >70% security habitat.

b) Russell Ridge MLSA

(1) Introduction

In this section information is presented about wildlife species that are associated with the late-successional habitats that are either present or would be managed for in the Russell Ridge MLSA. A total of 80 species have been identified as being associated with these kinds of forest conditions and are present, unknown or suspected to occur within the MLSA. The list of these species can be found in Appendix 27.

In addition to consideration for the groups of species associated with the various kinds of late-successional forests, individual species assessments were also conducted. These assessments were completed for all threatened, endangered, sensitive, species of concern (USFWS), management indicator, protection and buffer, and survey and manage species. Collectively this group of species is referred to as species of special status. What information is available about the status of these species within the Russell Ridge MLSA is summarized in this chapter. However, relatively little is known about a number of them.

Inventories or surveys have been conducted for only a few of the wildlife as shown in Appendix 27. The most extensive of these were for tailed frogs and Cascades frogs. Northern spotted owl inventories have been conducted over 100% of the suitable habitat within the MLSA.

(2) Late Successional Species By Habitat Type

(a) Dry Forests

About 5,423 acres (44%) of the Russell Ridge MLSA is composed of the dry forest vegetation group. Fire climax ponderosa pine forests historically dominated these areas and 49 wildlife species are associated with these forests.

Currently, 4,048 acres (75%)of the dry forest is in a successionally advanced condition. About 13 acres (0.2%) are in a low density condition and could be fire-climax.

Some species that are associated with the late successional or fire-climax conditions of these forests and that have special management status include: tailed frog, larch mountain salamander, northern goshawk, bald eagle, flammulated owl, pileated woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, northern flicker, chestnut backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, silver haired bat, fringed myotis, western big-eared bat, pallid bat, marten, and fisher.

Historically, only a minor portion of these areas provided the structures that are associated with suitable spotted owl habitat (Thomas et al. 1990, Buchanan et al. 1995). However, fire exclusion has allowed successional advancement for suitable spotted owl habitat to develop in some areas (Agee and Edmunds 1992, Buchanan et al. 1995). These areas are now being used by spotted owls, however the risk of large scale disturbances causing large scale habitat loss is of major concern (Agee and Edmunds 1992, Buchanan et al. 1995, Gaines et al. in press). Two spotted owl activity centers (S0864, S0831) occur in the Dry Forests of the Russell Ridge MLSA.

(b) Mesic Sites Within the Dry Forest

The mesic forest group could not be mapped for this MLSA because of limitations posed by having to model the vegetation. Mesic sites within the dry forests provide important wildlife habitat and add diversity across the landscape. It is suggested that these sites be identified during project level analysis and that the appropriate treatment criteria be applied.

Historically, fire occurred less frequently at these sites (refer to Chapter III) allowing for succession that resulted in more complex forest structure such as a higher canopy closure, multilayering, snags and down logs. These forests occurred in a variety of successional stages across the landscape. The late-successional conditions of these Mesic Forests provide habitat for about 66 wildlife species. The high potential for future fires presents a concern about the sustainability of these forests.

Wildlife species that occur in these habitats and are of special management status include: tailed frog, Cascades frog, larch mountain salamander, northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, chestnut-backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, western big-eared bat, silverhaired bat, pallid bat, marten, and fisher.

This forested vegetation group is capable of providing habitat structure that typically composes spotted owl nesting, roosting, foraging and dispersal habitat, while remaining within the historic range of variability.

(c) Moist Grand Fir Group

The Moist Grand Fir group covers about 3,130 acres (25%) of the MLSA. Historically, fire occurred less frequently than in the Dry and Mesic vegetation groups (refer to Chapter III), allowing successional advancement and complex habitat structure such as high crown closure, multilayering, and many snags and down logs. These conditions provide habitat for a wide array of wildlife species, including 73 species within the Russell Ridge MLSA.

Currently, about 2,114 acres (68%) of the Moist Grand Fir group in this MLSA is in a late-successional condition. In the absence of any major disturbance, it is expected that in 50 years 2,114 acres (68%), and in 100 years 3,130 acres (100%) of this habitat would be in a late-successional condition.

Wildlife species associated with the late-successional conditions of this vegetation group and of special status include the northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten and fisher.

The Moist Grand Fir vegetation group is capable of providing structures that compose suitable spotted owl nesting, roosting, and foraging habitat while remaining within the range of historic variability. No known spotted owl activity centers are located within this vegetation group.

(d) Wet Forest Group

The Wet Forest Group covers only about 1,721 acres (14%) of the Russell Ridge MLSA. Historically fire occurred relatively infrequently (refer to Chapter III) allowing for succession to result in complex forest structures such as high crown closure, multilayering, and high numbers of snags and down logs. These conditions provide habitat for about 54 species that are associated with the late-successional conditions of these forests.

Currently, 1,454 acres (84%) are in a late-successional condition. In the absence of any large scale disturbances in 50 years 1,454 acres (84%) would be in a late-successional condition, and in 100 years 1,721 acres (100%) would be late-successional.

Wildlife species that are associated with the late-successional conditions of this vegetation group and are of special status include northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, Warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten, and fisher.

The Wet Forest Group is capable of providing structure that composes suitable spotted owl nesting, roosting and foraging habitat while remaining within the historic range of variability. One known spotted owl activity center is located within this vegetation group in the MLSA.

(e) Subalpine Fir

Subalpine Fir covers about 424 acres (3%) of the MLSA. Historically, fire frequency was relatively low but when fires did occur they were of high intensity. The longer fire return interval allowed for successional advancement that resulted in complex habitat structure such as high canopy closure, high numbers of snags and down logs. Landscape pattern was historically highly variable with a mosaic of seral stages providing habitat for a variety of wildlife species. About 41 wildlife species within the MLSA are associated with the late-successional conditions of these forests.

Currently, about 424 acres (100%) of the Subalpine Fir forests are in a late-successional condition..

Wildlife species that are associated with the late-successional forest in this vegetation group and have special status include the tailed frog, Cascades frog, larch mountain salamander, northern goshawk, bald eagle, northern spotted owl, great gray owl, pileated woodpecker, downy woodpecker, hairy woodpecker, black-backed woodpecker, three-toed woodpecker, Williamson's sapsucker, little willow flycatcher, olive-sided flycatcher, pygmy nuthatch, long-eared myotis, Yuma myotis, lynx, and marten.

Spotted owls occasionally use these forests, however, usually they only provide foraging habitat

(3) Species Specific Information

The information presented in this section provides an overview of what is known about the species identified in Appendix 27 as species of special status. Information is provided on a species by species basis whenever it is available.

(a) Endangered Or Threatened Wildlife Species

There are five wildlife species that are federally listed as Threatened or Endangered and could occur within the Russell Ridge MLSA. These include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos*) and gray wolf (*Canis lupus*).

The bald eagle is suspected to occur within the Russel Ridge MLSA and none of the available habitat has been surveyed. It is suspected that peregrine falcons occur within the MLSA and none of their habitat has been surveyed.

(i) Spotted Owls

Two spotted owl activity centers occur within the Russel Ridge MLSA and 100% of the habitat has been surveyed. There are 6,042 acres (49%) of suitable nesting/roosting/foraging habitat within the MLSA. The MLSA is capable of having up to 9,323 acres or 76%, in suitable spotted owl habitat. However, 4,048 acres of potential habitat are in the dry forest group, which would not be sustainable. Two spotted owl activity centers are located in the MLSA and are currently below the "take" threshold..

Table VIII-2, Spotted Owl Status and Habitat Information for the Russel Ridge MLSA

(b) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within the Russel Ridge MLSA. Grizzly bears and gray wolves are suspected to occur within the MLSA. None of their available habitat has been surveyed.

(c) Sensitive Species and Species of Concern

There are 15 wildlife species that are on the R6 Sensitive Species list or are USFWS species of concern that could occur within the Russel Ridge MLSA. These include the goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed *frog (Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascade frog (*Rana cascadae*), Columbia pebblesnail (*Fluminicola columbiana*), long-legged myotis (*Myotis volans*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanoides*), Yuma myotis (*Myotis yumanensis*), Western big-eared bat (*Plecotus townsendii*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), and wolverine (*Gulo gulo*).

(i) Birds

The goshawk is known to occur and no surveys have been completed for available habitat. It is suspected that the little willow flycatcher and the olive-sided flycatcher occur. No surveys have been completed.

(ii) Amphibians

Surveys for amphibians have not been completed within the Russel Ridge MLSA. It is known that the tailed frog, spotted frog and Cascades frog occur in the MLSA. Surveys have been completed for 30 % of tailed frog and Cascades frog habitat. Ten percent of spotted frog habitat has been surveyed.

(iii) Mollusks

No surveys for the Columbia pebblesnail have been conducted and it is unknown if they are present.

(iv) Mammals

Surveys for bat species have not been completed. It is unknown or suspected that the long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis or the western big-eared bat occur in the Russel Ridge MLSA.

Surveys for lynx, wolverine and fisher have not been conducted. All three are suspected to occur in the MLSA.

(d) Management Indicator Species

There are 12 wildlife species that are listed as management indicator species that occur or could occur within the Russel Ridge MLSA. These species include the pileated woodpecker (Dryocopus

pileatus), downy woodpecker (Picoides pubescens), hairy woodpecker (Picoides villosus), three-toed woodpecker (Picoides tridactylus), red-breasted sapsucker (Sphyrapicua ruber), Williamson's sapsucker (Sphyrapicua thyroideus), northern flicker (Colaptes auratus), ruffed grouse (Bonasa umbellus), mule deer (Odocoileus hemnionus), elk (Cervus elephus), beaver (Castor canadensis), and marten (Martes americana).

(e) Primary Cavity Excavators

No formal surveys for primary cavity excavators have been completed. The Williamson's sapsucker and northern flicker are known to occur within the MLSA and the remaining MIS primary cavity excavators are suspected to occur.

(i) Ruffed Grouse and Beaver

Ruffed grouse and beaver are suspected to occur in the MLSA. No surveys have been conducted.

(ii) Mule Deer, Elk

Mule deer and elk are known to occur in the MLSA. No surveys have been conducted.

(iii) Marten

Marten are suspected to occur in the MLSA and no habitat has been surveyed.

(f) Survey And Manage, Protection And Buffer Species

There are eight species that do or could occur within the Russell Ridge MLSA and are identified as survey and manage, or protection and buffer species. These include the great gray owl (Strix nebulosa), flammulated owl (Otis flammeolus), White-headed woodpecker (Picoides albolarvatus), black-backed woodpecker (Picoides arcticus), pygmy nuthatch (Sitta pygmaea), warty jumping slug (Hemphillia glandulosa), blue-gray tail-dropper (Prophysaon coeruleum), and papillose tail-dropper (Prophysaon dubium).

(i) Birds

It is suspected that the great gray owl, flammulated owl, pygmy nuthatch, three toed woodpecker and hairy woodpecker occur within the Russel Ridge MLSA. The white-headed woodpecker and black-backed woodpecker are known to occur. No surveys have been completed.

(ii) Mollusks

It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the MLSA and no surveys have been completed.

(iii) Habitat Effectiveness

Habitat effectiveness was measured using the current open road density and the amount of security habitat. The current open road density within the MLSA is 2.4 mi./sq.mi. and the amount of area in security habitat is 26%. This information shows that habitat effectiveness is considered to be "low" (>2 mi./sq.mi.) relative to roads and "low" relative to security habitat (<50%). The long term management objective for MLSA/LSRs is to manage towards a "high" level of habitat effectiveness defined as >1mi./sq.mi. open road density and >70% security habitat.

3. Human Uses

a) Overview

The Tieton LSR, Lost Lake and Russell Ridge MLSAs are located on the southern end of the Naches Ranger District. Of particular importance in this drainage is an automobile route, U.S. Highway 12 crossing the Cascade Range at White Pass and Rimrock Lake and the work to create a reservoir created for irrigation purposes.

b) Prehistoric and Historic Summary

Considerable evidence of American Indian use has been found in and near these areas. Ethnographic accounts suggest there was a permanent winter village near Rimrock Lake. This use is attributable to the many meadows (prior to the reservoir at Rimrock Lake much of this area was a series of interconnected meadows) providing root gathering opportunities. White Pass also was an early travel route across the Cascades. There are other scattered, prehistoric sites in this area. This area has a considerable documentation of mythology associated with it. One particular feature included in this mythology is associated with Kloochman Rock, a vertical volcanic dike.

Much of the historic activity of this area was related to building dams Rimrock Lake (1924) and Clear Lake (1914) for use as irrigation reservoirs and constructing highway 12 over White Pass (1951). Early settlers located near McCallister Meadows and along the Tieton River.

In the late 1800's and early 1900's sheep grazing was extensive, in 1889 an estimated 170,000 sheep were grazing in the Tieton, Naches and Ahtanum drainages. The Cowlitz Trail was used at the turn of the century to drive sheep over the Cascades. In 1908 the numbers of sheep grazing on the same drainages had declined to 31,000.

Fossils from an orodont pig (Pleistocene era) have been discovered in the Wildcat Creek area in the Russel Ridge MLSA.

c) Recreation

(1) Campgrounds

(a) Tieton LSR

The Tieton LSR has two campground, Dog Lake with 9 campsites and the South Fork Tieton campground with 9 campsites. Dog Lake includes a boat launch facilities and trailhead access into the William O. Douglas Wilderness. This campground is heavily used as it is easily accessed from the highway and provides easy access to the wilderness. The South Fork Tieton is predominantly used by motorized Off Highway Users (OHV, 4x4, quads and motorcycle) as it is close to a number of 4x4 trail driveways and other motorized trails. This campground is moderately used..

Clear Lake Day Use site is adjacent to, but just outside the LSR. This facility is highly developed and fully accessible with paved trails, a shelter and fishing platforms.

Clear Creek Overlook is a day use highway wayside site that offers travelers a vista of Clear Creek Falls, restrooms and interpretive signs.

(b) Lost Lake MLSA

This MLSA includes Wild Rose (8 campsites) and Willows (15 campsites) Campgrounds These are moderate use campgrounds receiving considerable use by highway traverlers and river rafters during the rafting season. Wild Rose is open year-round, although at a reduced service level during off season periods.

(c) Russell Ridge MLSA

Horseshoe Cove, a day use area, is located within this MLSA. It is heavily used by windsurfers and for launching motorboats on Rimrock Lake.. The only facilities include one set of toilets.

(2) Dispersed Camping

This LSR and two MLSAs have a number of scattered sites that are used by hunters, trail users and other recreationists. There are some locations where dispersed camping use is concentrated. These focal points are highlighted in the following sections.

(a) Tieton LSR

There are a number of locations that are focal points for dispersed camping activities in this LSR, this includes Grey Creek, Minnie Meadows, Bakeoven Flats, Scatter Creek Trailhead, and Section 3 Lake on Pine Grass Ridge. Recreationists using the challenging 4x4 routes (a unique recreational feature of this LSR) stage at Minnie Meadows, Bakeoven and Grey Creek.

Minnie Meadows also has toilets and a few picnic tables as well as a fenced enclosure. This is probably the most popular dispersed area within the Tieton LSR. Most of the users are 4x4 owners, using the nearby 4x4 driveways.

Bakeoven Flat has toilets and a bulletin board. The use at this dispersed site is probably only second to that occurring at Minnie Meadows. Most of the campers using this area motorized trail users.

The Grey Creek area was formerly managed as a campground. Today the only facilities remaining from that time are some picnic tables.

Scatter Creek Trailhead is another site that experiences some degree of dispersed camping activity. This trailhead provides a well used access to the Goat Rocks Wilderness.

Section 3 Lake on Pine Grass Ridge is another trailhead that hosts some degree of dispersed camping. This trailhead provides access to Bear Creek Mountain a well known and heavily used summer day hikes destination point.

(b) Lost Lake MLSA

The Lost Lake dispersed camping area is well used by fishermen (Lost Lake is stocked by the state) and other campers. The only facilities are toilets.

Jumpoff Meadows is another dispersed area that is popular with equestrians and hunters. This site is particularly popular for use by large groups, who are considered "oversized" by wilderness standards.

Sleepy Park is a large meadow area that serves as a dispersed site for large groups.

(c) Russell Ridge MLSA

The areas near Thunder and Lightning Lakes are frequently used by fishermen and other campers.

(3) Trails

There are a number of trailheads and trails within this LSR and two MLSAs. Motorized use, particularly by 4x4 enthusiasts is a very dominant recreation activity occurring on this portion of the Naches Ranger District. System and user established trails are located largely within the southeast portion of the Lost Lake MLSA and the South Fork of the Tieton of the Tieton LSR. None occur on the Russell Ridge MLSA. More detail on trailheads, trails and use is provided in the following sections.

(a) Tieton LSR

The South Fork Teton area has particularly heavy 4x4 use occurring with a considerable number of driveways. Some of these driveways have been established by users and are not part of formal system trails.

Minnie Meadows, Bakeoven Flats, Grey Creek and South Fork Tieton provide access to 4x4 driveways. These are all popular, well used staging areas.

Andy Creek, Indian Creek and Sand Ridge trailheads and the White Pass Horse Camp provide important access to the William O. Douglas Wilderness.

Section 3 Lake, Round Mountain and Scatter Creek trailheads provide access to the Goat Rocks Wilderness.

(b) Lost Lake MLSA

There is a single tread non-motorized trail - #1146 and a single tread motorized trail #1126 in the MLSA. There are also several four wheel driveways, some are system routes and some are not.

In the southeast portion of this MLSA there are many user established motorized trails. Efforts are underway to develop an All Terrain Vehicle Plan that would formally establish some of the motorized trails and close other trails within the planning area. This ATV Plan covers a portion of the Lost Lake MLSA as well as the Upper Nile LSR and Haystack MLSA.

(c) Russell Ridge MLSA

Within this MLSA there are trailheads at Russell Ridge, Wildcat and Willow Tree that provide access to the William O. Douglas Wilderness.

There is also a 9 mile loop trail outside the wilderness open to single tread motorized use (motorcycle). Numerous roads were constructed in this MLSA for timber harvest purposes. Many of these roads are being allowed to grow in and revert to a single track trail open to motorized users.

(4) Winter Use

Some snowmobiling and cross country ski use occurs in these areas. More detail is provided in the following sections.

(a) Tieton LSR

Snowmobiling is a very popular activity in some portions of this LSR such as in the Pine Grass Ridge and South Fork Tieton areas along groomed routes and snow covered roads. The Scatter Creek and Round Mountain areas are closed to snowmobile use.

The Clear Lake Ski Trail system lies west of Clear Lake and in the North Fork Tieton drainage. This system as well as the Round Mountain area is lightly used by cross country skiers.

(b) Lost Lake MLSA

There is a popular snowmobile loop in this LSR, a portion of this route follows Road 1201.

Jumpoff Lookout is a popular destination with snowmobilers, offering excellent vistas of the surrounding countryside.

(c) Russell Ridge MLSA

There is some cross country skiing use on the Wildcat and Russell Ridge trails and area roads.

(5) Other Recreation

There is a variety of other recreation related activities occurring within or adjacent to these areas. This includes fishing, outfitter guiding, driving for scenery, rock climbing. More detail is provided in the following sections. Rimrock Lake, adjacent to the Tieton LSR and Russell Ridge MLSA, is a special focus of water sports related activities, this includes fishing, motorboating, jet skiing and wind surfing and canoeing.

U.S. Highway 12, portions of which lie within all three areas, is a Washington State Scenic Byway. This route provides a popular scenic drive for area visitors.

(a) Tieton LSR

Fishing is closed on the South Fork of the Tieton River from Tieton Falls to Rimrock Lake. This closure was implemented due to concerns about bull trout populations.

There are outfitter guide horse rides and packing activities that are based out of the Indian Creek Corral.

Dog Lake is a small deep lake that has some fishing activity. Clear Lake, located just outside of this LSR, is open to boats with small motors. This lake is stocked and popular with fishermen.

(b) Lost Lake MLSA

Irrigation water releases from Rimrock Lake in the fall provide river flows on the Tieton that has attracted considerable use from river rafters. Most rafters pass through the Lost Lake MLSA. There are an estimated 6,000 people who enjoy this activity annually on this stretch of the Tieton.

Jumpoff Lookout is no longer staffed however the facility remains open for public use. It is a popular focal point, providing visitors an outstanding vista of the surrounding countryside and a unique camping opportunity for some recreationists. The drive to the lookout, outside of the MLSA, is also popular for its scenic quality.

Lost Lake Loop 1201 is a popular touring route for drivers.

Koochman Rock, a vertical, basalt dike, provides technical rock climbing opportunities.

(c) Russell Ridge MLSA

Devil's Postpile, a site with columnar basalt features is also a popular rock climbing location.

d) Mining

There are no active mining operations within these areas.

e) Social and Economic Considerations:

The recreation activities that occur in and near these areas, off road vehicle travel, hiking, fishing, motorboating, wind surfing, jet skiing, snowmobiling, cross country skiing and driving for pleasure all provide important contributions to the local economy such as outfitter guides, resorts and other tourism based businesses.

There are two, active grazing allotments located in the South Fork of the Tieton.

B. Analysis Between LSR/MLSAs

1. Sustainability (Tieton LSR and Lost Lake MLSA)

a) Sustainability Analysis

The sustainability of LSRs/MLSAs across the Forest is displayed in Table 19. The Tieton LSR falls in the lower 1/3 of all LSR/MLSAs in terms of amount of vegetation at risk to loss from catastrophic fire. The Lost Lake MLSA falls in the upper 1/3 in terms of amount of at risk vegetation. In this respect, the two LSR/MLSAs appear to be dissimilar, however, the lower 1/3 of the Tieton LSR is actually very similar to the Lost Lake MLSA in terms of at risk vegetation. An important consideration in terms of sustainability is the relationship between these two LSR/MLSAs and there neighboring LSR/MLSAs. This includes the amount of at risk vegetation within the LSR/MLSAs as well as the extent of at risk vegetation between them. For the purposes of this analysis three LSR/MLSAs are considered to be neighbors: Russell Ridge; Rattlesnake; and, Bumping.

The following table shows a comparison of the acres at risk and the ignition risk determined in the Forest-wide sustainability analysis for the Tieton LSR and the Lost Lake MLSA and their three neighboring LSR/MLSAs.

Table VIII-3, Acres at Risk and Ignition Risk, Tieton LSR and Lost Lake MLSA.

LSR/MLSA	% of LSR/MLSA at Risk		% of LS Forest at Risk		Ignition Risk
	Acres	Pct.	Acres	Pct.	
Tieton	12,057ac	30%	7,840ac	33%	Moderate
Lost Lake	5,069ac	73%	4,891ac	100%	Moderate
Russell Ridge	7,024ac	57%	6,586ac	82%	Moderate
Rattlesnake	6,641ac	63%	4,846ac	82%	Moderate
Bumping	165ac	1%	165ac	2%	Moderate

When looking at sustainability issues between LSRs/MLSAs, the factor driving this analysis is the amount and location of at-risk vegetation between the Tieton LSR and Lost Lake MLSA and their three neighbors. In other words, identifying linkages in at-risk vegetation that would facilitate the spread of fire from one LSR/MLSA to another.

The Tieton LSR and the Lost Lake MLSA are in close proximity of each other and most of the vegetation between the two is at risk vegetation. This would make the likelihood of fire spreading from one to the other high.

There is also a significant amount of at risk vegetation occurring between these 2 LSR/MLSAs and the Russell Ridge MLSA. The potential for a fire occurring with resultant effects on all of these LSR/MLSAs at the same time is high.

The situation as it relates to the Rattlesnake LSR is a bit different. There is some at risk vegetation but not to the same degree as between Tieton, Lost Lake and Russell Ridge and there is a lesser risk of fire spread between these LSR/MLSAs.

A review of at-risk vegetation maps reveals that this linkage does not exist between the Tieton LSR and the Bumping LSR

(1) Implications

1. Reduce stand density in dense dry successionally advanced vegetation types (types 12 and 22) where they exist between Tieton, Lost Lake and Russell Ridge LSR/MLSAs as a first priority and between these LSR/MLSAs and Rattlesnake LSR as a second priority.

Potential Projects - Commercial Thinning

2. Encourage private land owners in the Lower Tieton and Rattlesnake areas to take stand density management actions on private forested areas.

Potential Projects - Communicate need to local landowners.

3. Reduce fuel loading along roads that exist between Tieton, Lost Lake and Russell Ridge LSR/MLSAs to increase the roads effectiveness as fuel breaks. The best chance for this is along US Highway 12 and the road to Sleepy Park Springs.

Potential Projects - Piling of down fuels, firewood gathering, pruning to reduce vertical fuel concentrations (all vegetation types), construction of shaded fuel breaks.

4) Reduce fuel loading in young stands where they occur between Tieton, Lost Lake and Russell Ridge.

Potential Projects - Precommercial Thinning.

2. Sustainability (Russell Ridge MLSA)

a) Sustainability Analysis

The sustainability of LSRs/MLSAs across the Forest is displayed in Table 19. The Russell Ridge MLSA falls in the upper 1/3 of all LSR/MLSAs in terms of amount of vegetation at risk to loss from catastrophic fire. An important consideration in terms of sustainability is the relationship between the Russell Ridge MLSA and its neighboring LSR/MLSAs. This includes the amount of at risk vegetation within the LSR/MLSAs as well as the extent of at risk vegetation between them. For the purposes of this analysis four LSR/MLSAs are considered to be neighbors: Tieton; Lost Lake; Rattlesnake; and, Bumping.

The following table shows a comparison of the acres at risk and the ignition risk determined in the Forest-wide sustainability analysis for the Russell Ridge MLSA and its four neighboring LSR/MLSAs.

Table VIII-4, Acres at Risk and Ignition Risk, Russell Ridge MLSA.

LSR/MLSA	% of LSR/MLSA at Risk		% of LS Forest at Risk		Ignition Risk
	Acres	Pct.	Acres	Pct.	
Russell Ridge	7,024ac	57%	6,586ac	82%	Moderate
Tieton	12,057ac	30%	7,840ac	33%	Moderate
Lost Lake	5,069ac	73%	4,891ac	100%	Moderate
Rattlesnake	6,641ac	63%	4,846ac	82%	Moderate
Bumping	165ac	1%	165ac	2%	Moderate

When looking at sustainability issues between LSRs/MLSAs, the factor driving the analysis is the amount and location of at-risk vegetation between the Russell Ridge MLSA and its four neighbors. In other words, identifying linkages in at-risk vegetation that would facilitate the spread of fire from one LSR/MLSA to another.

There is a significant amount of at risk vegetation occurring between the Russell Ridge MLSA and both the Tieton LSR and Lost Lake MLSA. Most of this at risk vegetation is along both sides of Highway 12 on the lower end of Rimrock Lake. The potential for a fire occurring with resultant effects on all of these LSR/MLSAs at the same time is high.

The situation as it relates to the Rattlesnake LSR is a bit different. The Russell Ridge MLSA is in close proximity to the Rattlesnake LSR and there is some at risk vegetation between them, but not to the same degree as between Tieton, and Lost Lake and there is a lesser risk of fire spread between these LSR/MLSAs. The area where the two LSR/MLSAs are closest to each other is in the high elevation area along Bethel Ridge.

A review of at-risk vegetation maps reveals that an at risk vegetation linkage does not exist between the Russell Ridge MLSA and the Bumping LSR

(1) Implications

1. Reduce stand density in dense dry successionally advanced vegetation types (types 12 and 22) where they exist between Tieton, Lost Lake and Russell Ridge LSR/MLSAs as a first priority and between Russell Ridge MLSA and Rattlesnake LSR as a second priority.

Potential Projects - Commercial Thinning

2. Encourage private land owners in the Lower Tieton and Rattlesnake areas to take stand density management actions on private forested areas.

Potential Projects - Communicate need to local landowners.

3. Reduce fuel loading along roads that exist between Tieton, Lost Lake and Russell Ridge LSR/MLSAs to increase the roads effectiveness as fuel breaks. The best chance for this is along US Highway 12 as a first priority and in the vicinity of Bethel Ridge as a second priority.

Potential Projects - Piling of down fuels, firewood gathering, pruning to reduce vertical fuel concentrations (all vegetation types), construction of shaded fuel breaks.

4) Reduce fuel loading in young stands where they occur between Tieton, Lost Lake and Russell Ridge.

Potential Projects - Precommercial Thinning.

5) Maintain desired fuel levels and vegetation characteristics in low density dry forest vegetation types. The greatest opportunity for this is in the area between the Russell Ridge MLSA and the Tieton LSR and Lost Lake MLSA.

Potential Projects - Prescribed Fire.

3. Forest-Wide Northern Spotted Owl

The Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA are not designated as one of the Forest's three large population cluster/source center LSRs, for the recovery of the spotted owl. The Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA is part of the smaller "local population" centers, which are linked to the meta-populations through dispersing individuals (see LSR/MLSA maps on page 8 &

9 of the main document). The spotted owl is a Threatened species, with the recovery dependent on the implementation of the NWFP, especially in LSR/MLSAs (FSEIS Appendix G, Biological Opinion, 1994).

4. Connectivity (Plant, Wildlife and Northern Spotted Owl)

a) Plant Connectivity

Connectivity can be addressed at several spatial scales when assessing an individual LSR. Connectivity of the LSR/MLSA network on the Wenatchee National Forest has been addressed above in the "Function of the LSR/MLSA Network" section of the "Late Successional Reserve and Managed Late Successional Area Assessment, Wenatchee National Forest". Connectivity specific to the Tieton LSR, Lost Lake and Russell Ridge MLSAs for vascular plants is analyzed from two perspectives here. Refer to the Forest-wide Assessment discussions for connectivity description for lichens, bryophytes, and fungi.

First, connectivity relative to the Tieton LSR can be viewed from how well habitat is connected to surrounding LSR's or MLSA's. Connectivity exists for all dispersal classes between the Tieton LSR and Lost Lake MLSA. Between Tieton LSR and Russell Ridge MLSA, connectivity exists for the high and moderate dispersal classes but, is dependent upon vegetation between for the low dispersal class. No connectivity exists for any dispersal class between the Tieton LSR and the Bumping LSR. The lack of connectivity between these two LSRs is due to the great distances resulting from the geographic location of this vegetation group on the landscape.

Relative to species associated with the moist grand fir/mesic western hemlock vegetation group, connectivity exits for all dispersal classes between the Tieton LSR and the Lost Lake MLSA. Connectivity between Tieton LSR and Russell Ridge MLSA exists for the high dispersal class, while the moderate dispersal class is dependent upon vegetation between. No connectivity exists for the low dispersal class species. No connectivity exists for any dispersal class between the Tieton LSR and the Bumping LSR. Again, the lack of connectivity is due to the great distances resulting from the geographic location of this vegetation group on the landscape.

Relative to species associated with the subalpine vegetation group, no connectivity exists between Tieton LSR and Lost Lake MLSA for the low and moderate dispersal class species. The high dispersal class species are dependent upon vegetation between these areas for connectivity. The lack of connectivity for moderate and low classes is a function of the isolated nature of this vegetation group. Connectivity between Tieton LSR and Russell Ridge MLSA is dependent on vegetation between these areas for the moderate and high dispersals class species. No connectivity exists for the low dispersal class species between these areas. Due to the absence of the subalpine fir vegetation group in the Bumping LSR, no connectivity exists between the Bumping and Tieton LSRs.

Relative to species associated with the wet forest vegetation group, connectivity does not exist for any dispersal class between the Tieton LSR and Lost Lake MLSA. This is due to the absence of the wet vegetation group in the Lost Lake MLSA. Connectivity between Tieton LSR and Russell Ridge MLSA exists for the high dipsersal class species, but does not exist for the low and moderate dispersal classes. Connectivity between the Tieton LSR and the Bumping LSR for the high dipsersal class species is dependent upon vegetation between. No connectivity exists for the moderate and low dispersal classes due to the great distances resulting from the geographic location of this vegetation type on the landscape.

Because whitebark pine only occurs within the Tieton LSR as isolated patches, no connectivity exists for this vegetation group.

In general, few opportunities to improve habitat connectivity for vascular plant species associated with a particular forest vegetation group were identified as a result of this analysis. In the dry and wet vegetation groups, the lack of connectivity is a result of inherent landscape patterns. In the moist grand fir/mesic western hemlock vegetation group, maintenance of existing dispersal corridors and promotion of mature/late-successional vegetation may provide opportunities for improving connectivity.

(1) Tieton LSR Vascular Plant Connectivity

The following table presents the results of the connectivity analysis applied to the Tieton LSR. Comparisons are made between the Tieton LSR and the three neighboring LSR/MLSA's in terms of plant species being able to disperse from one LSR to the other. Determinations are made for each vegetation gorup common to the LSR's for each of 3 dispersal classes.

Table VIII-5, Tieton LSR Vascular Plant Connectivity

	Vegetation Group														
LSR/MLSA	**Dry/Mesic**			**Moist GF**			**Subalpine**			**Wet**			**Whitebark**		
Dispersal Class	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Lost Lake	Y	Y	Y	Y	Y	Y	N	N	D	A	A	A	A	A	A
Russell Ridge	D	Y	Y	N	D	Y	N	D	D	N	N	Y	A	A	A
Bumping	N	N	N	N	N	N	A	A	A	N	N	D	A	A	A

Dispersal Codes: Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Habitat Outside LSR/MLSA)

Dispersal Classes: 1=Capable of dispersing up to 1 mile; 2=Capable of dispersing up to 3 miles; 3=Capable of dispersing up to 5 miles.

First, connectivity relative to the Lost Lake MLSA can be viewed from how well habitat is connected to surrounding LSR's or MLSA's. Connectivity between the Lost Lake MLSA and the Tieton LSR was discussed above and will not be repeated here. In the dry forest vegetation group, connectivity exists between the Lost Lake MLSA and the Russell Ridge MLSA and between the Lost Lake MLSA and the Rattlesnake LSR for the high dispersal class species. For the low and moderate dispersal class species, connectivity is dependent upon vegetation outside the MLSA/LSR.

Relative to species associated with the moist grand fir/mesic hemlock vegetation group, connectivity exists for the high dispersal class between Lost Lake MLSA and Russell Ridge MLSA. The moderate dispersal class is dependent upon vegetation between the areas. No connectivity exists for the low dispersal class species. Connectivity between Lost Lake MLSA and Rattlesnake LSR is dependent on vegetation between for the moderate and high dispersal classes, while no connectivity exists for the low dispersal class.

Due to the great distances resulting from the geographic location of the vegetation group on the landscape, no connectivity exists between Lost Lake MLSA and Russell Ridge MLSA or Lost Lake MLSA and the Rattlesnake LSR.

In general, few opportunities to improve habitat connectivity for vascular plant species associated with a particular forest vegetation group were identified as a result of this analysis. In the dry and wet vegetation groups, the lack of connectivity is a result of inherent landscape patterns. In the moist grand fir/mesic western hemlock vegetation group, maintenance of existing dispersal corridors and promotion of mature/late-successional vegetation may provide opportunities for improving connectivity.

(2) Lost Lake MLSA Vascular Plant Connectivity

The following table presents the results of the connectivity analysis applied to the Lost Lake MLSA. Comparisons are made between the Lost Lake MLSA and the three neighboring LSR/MLSA's in terms of plant species being able to disperse from one LSR to the other. Determinations are made for each vegetation gorup common to the LSR's for each of 3 dispersal classes.

Table VIII-6, Lost Lake MLSA Vascular Plant Connectivity

	Vegetation Group														
LSR/MLSA	**Dry/Mesic**			**Moist GF**			**Subalpine**			**Wet**			**Whitebark**		
Dispersal Class	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Russell Ridge	D	D	Y	N	D	Y	N	N	N	A	A	A	A	A	A
Rattlesnake	D	D	Y	N	D	D	N	N	N	A	A	A	A	A	A

Dispersal Codes: Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Habitat Outside LSR/MLSA)

Dispersal Classes: 1=Capable of dispersing up to 1 mile; 2=Capable of dispersing up to 3 miles; 3=Capable of dispersing up to 5 miles.

First, connectivity relative to the Russell Ridge MLSA can be viewed from how well habitat is connected to surrounding LSR's or MLSA's. Connectivity is dependent on vegetation between for all dispersal classes relative to the Russell Ridge MLSA and Rattlesnake LSR. Between the Russell Ridge MLSA and the Bumping LSR, connectivity is dependent upon vegetation between for the high dispersal class and, does not exist for the low or moderate dispersal classes. The lack of connectivity between these two areas is due to the great distances resulting from the geographic location of this vegetation group on the landscape.

Relative to species associated with the moist grand fir/mesic western hemlock vegetation group, connectivity exits for the high dispersal class between the Russell Ridge MLSA and the Rattlesnake LSR. Connectivity for the low and moderate classes is dependent upon vegetation between these two areas. Connectivity between the Russell Ridge MLSA and Bumping LSR is dependent on vegetation between for the high dispersal class and does not exist for the low and moderate. Again, the lack of connectivity is due to the great distances resulting from the geographic location of this vegetation group on the landscape.

Relative to species associated with the subalpine fir vegetation group, connectivity exists for the moderate and high dispersal classes between Russell Ridge MLSA and Rattlesnake LSR. The low dispersal class is dependent upon vegetation between the areas . The subalpine fir vegetation group is absent from the Bumping LSR.

Relative to species associated with the wet forest vegetation group, connectivity exists for the moderate and high dispersal classes between Russell Ridge MLSA and the Rattlesnake LSR. The low dispersal class is dependent upon vegetation between. Connectivity between Russell Ridge MLSA and the Bumping LSR is dependent on vegetation between the areas for the high dispersal class. No connectivity exists for the moderate and low dispersal classes due to the great distances resulting from the geographic location of this vegetation type on the landscape.

In general, few opportunities to improve habitat connectivity for vascular plant species associated with a particular forest vegetation group were identified as a result of this analysis. In the dry and wet vegetation groups, the lack of connectivity is a result of inherent landscape patterns. In the moist grand fir/mesic western hemlock vegetation group, maintenance of existing dispersal corridors and promotion of mature/late-successional vegetation may provide opportunities for improving connectivity.

(3) Russell Ridge MLSA, Vascular Plant Connectivity

The following table presents the results of the connectivity analysis applied to the Russell Ridge MLSA. Comparisons are made between the Russell Ridge MLSA and the four neighboring LSR/MLSAs in terms of plant species being able to disperse from one LSR to another. Determinations are made for each vegetation group common to the LSRs for each of 3 dispersal classes.

Table VIII-7, Russell Ridge MLSA Vascular Plant Connectivity

	Vegetation Group														
LSR/MLSA	**Dry/Mesic**			**Moist GF**			**Subalpine**			**Wet**			**Whitebark**		
Dispersal Class	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Rattlesnake	D	D	D	D	D	Y	D	Y	Y	D	Y	Y	A	A	A
Bumping	N	N	D	N	N	D	A	A	A	N	N	D	A	A	A

Dispersal Codes: Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Habitat Outside LSR/MLSA)

Dispersal Classes: 1=Capable of dispersing up to 1 mile; 2=Capable of dispersing up to 3 miles; 3=Capable of dispersing up to 5 miles.

b) Wildlife Connectivity

(1) Tieton LSR and Lost Lake MLSA

Connectivity between late-successional patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between the Lost Lake MLSA and adjacent LSR/MLSAs the dispersion index was used (as described in Appendix ?). A total of three potential linkages were evaluated: Lost Lake to Russell MLSA, Lost Lake to Tieton LSR, and Lost Lake to Rattlesnake MLSA. The overall dispersion index for this LSR was 1.7.

Table VIII-8, Dispersion Indices for the Lost Lake MLSA

Linkage	Distance(Miles)	High	Moderate	Low	Index
LL-Russell	2	Yes	No	No	**1**
LL-Tieton	1	Yes	Yes	Yes	**3**
LL-Rattlesnake	5	Yes	No	No	**1**
Overall					**1.7**

Connectivity between late-successional patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between the Tieton LSR and adjacent LSR/MLSAs the dispersion index was used (as described in Appendix ?). A total of two potential linkages were evaluated: Tieton to the Russell MLSA, and Tieton to Lost Lake MLSA. The overall dispersion index for this LSR was 3.0.

Table VIII-9, Dispersion Indices for the Tieton LSR

Linkage	Distance(Miles)	High	Moderate	Low	Index
TI-Russell	0.5	yes	yes	yes	**3**
TI-Lost Lake	1	yes	yes	yes	**3**
Overall					**3.0**

(2) Russell Ridge MLSA

Connectivity between late-successional patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between the Russell MLSA and adjacent LSR/MLSAs the dispersion index was used (as described in Appendix ?). A total of three potential linkages were evaluated: Russell to Rattlesnake MLSA, Russell to Lost Lake MLSA, and Russell to Tieton LSR. The overall dispersion index for this LSR was 2.0.

Table VIII-10, Dispersion Indices for the Russell MLSA

Linkage	Distance(mi)	High	Moderate	Low	Index
RU-Rattlesnake	0.5	yes	yes	no	**2**
RU-Lost Lake	2	yes	no	no	**1**
RU-Tieton	0.5	yes	yes	yes	**3**
Overall					**2.0**

c) Northern Spotted Owl Connectivity

The Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA includes spotted owl pairs, and cluster of pairs, for connectivity to the north and south, and to the east and west. This LSR and MLSAs provide intra-and inter-provincial connectivity. These LSR/MLSAs encompass most of two CHUs for spotted owls, identified early in the recovery process for the northern spotted owls. The adjacent wilderness habitat is important to continue these linkages for spotted owls.

For final recovery of the northern spotted owl, smaller LSRs/MLSAs like these, contribute to the objective of occupied home ranges (See table 2? "Connectivity Between LSRs: Spotted Owl Pairs in LSRs and MLSAs, and CHU Goals" below). The CHUs in the Tieton LSR have a goal of 6+ pairs of spotted owls (it currently has 10 pairs of owls). The CHU in the Lost Lake MLSA has a goal of 1 pair of spotted owls (it currently has 1 pair of spotted owls). The Russell Ridge MLSA does not have CHU goals, it currently has 2 pairs.

Table VIII-11, Connectivity Between LSRs: Spotted Owl Pairs in LSRs and MLSAs, and CHU Goals

LSR or MLSA Status and Connectivity	S.Owl Pairs --1994, FSEIS Appendix G, Table G-3	Highest Occupancy and Reproductive Status, for Field Seasons 1995 ---- 1996		Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion.	
Crow DM14	--	5 Pr	5 site+1[1]	--	NA
Bumping RW126	2 Pr	7 Pr	4 sites + 4[1]	4+ Pr	WA-15
Upper Nile RW127	2 Pr + 1 RS	1 Pr + 1 RS	2 sites	--	NA
Haystack DM10	--	7 Pr + 1 RS	8 sites	--	NA
Rattlesnake RW128	3 Pr	3 Pr	3 sites	2+ Pr	WA-16
Russell Rdg DM11	**--**	**2 Pr**	**2 sites**	**--**	**NA**
Tieton RW153	**8 Pr**	**13 Pr**	**10 sites + 4 site[1]**	**6+ Pr**	**WA-17 WA-18**
Lost Lake DM12	**--**	**1 Pr**	**1 site**	**1 Pr**	**WA-17**
Clear Fork/Cowlitz LSR - 152 Gifford Pinchot NF	23 Pairs + 1 RS	?	?	25+	WA-

[1] Spotted owl activity center within 1/4 mile of LSR/MLSA boundary.

[2] Spotted owl activity center on Private Land.

The four nearest LSR/MLSA's were evaluated to determine their potential for dispersal to occur, these were Bumping LSR, Upper Nile LSR, Rattlesnake LSR, and Clear Fork Cowlitz LSR (GPNF). See Forest Interior Map and Suitable Spotted Owl Habitat Maps. This analysis showed that spotted owls could disperse from the:

- Lost Lake MLSA to the Tieton LSR via habitat between Golden Meadow and Sleepy Park Meadow.
- Lost Lake MLSA to Russell Ridge MLSA via habitat between Tieton Basin and Soup Creek.
- Tieton LSR to the Russell Ridge MLSA via habitat in Andy Creek to Russell Creek or between Indian Creek and Wildcat Creek.

- Tieton LSR/Russell Ridge to Bumping LSR via habitat between Indian Creek and Mosquito Valley. And between Wildcat, Little Wildcat, Rattlesnake Meadows, headwaters Rattlesnake to Copper Creek.
- Tieton LSR/Russell Ridge MLSA to Rattlesnake LSR via Wildcat Creek to Little Wildcat to Rattlesnake Meadows to Elkhorn to headwaters Little Rattlesnake.
- Tieton LSR to Clear Fork Cowlitz LSR (Gifford Pinchot NF) via habitat in Clear Creek and Cortright Creek.
- Tieton LSR/Russell Ridge MLSA to Upper Nile LSR via habitat between Indian Creek or Wildcat Creek to Rattlesnake Meadows and Rattlesnake to Buck Lake/North Fork Rattlesnake to Schneider Springs and Glass Creek.
- Russell Ridge MLSA to Rattlesnake LSR via habitat between Soup Creek and headwaters Little Rattlesnake Creek.
- Tieton LSR/Lost Lake MLSA to the Yakama Tribal Lands via habitat between Narrow Neck Gap and Divide Ridge. Also between Louie Way Gap and Divide Ridge.

The adjoining Wilderness Area habitat is important for all of these LSR connections. Some matrix lands are important for connectivity between LSR/MLSAs. These connectivity corridors should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc. Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSR's in Matrix and in AMA's, and in wilderness areas (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).

d) Restoration Opportunities And Potential Projects Between LSR/MLSAs

1. Protection of LSR/MLSA habitat from outside LSR/MLSA on Matrix lands, in the main Tieton River, Rimrock Lake, and House/Pine Creek areas.
2. Coordinate sustainable habitat and fire risk reduction on adjacent DNR lands and Tribal Lands.
3. Coordinate spotted owl viability between Tribal Lands, DNR lands and Gifford Pinchot NF.
4. Protection of late-successional habitat from fires started within the Goat Rocks and W.O. Douglas Wilderness areas.
5. Monitor or provide connectivity between LSR/MLSAs, particularly those lands adjoining the Yakama Reservation (Narrow Neck Gap), the upper Clear Creek, and Rattlesnake Meadows in the William O. Douglas Wilderness.

C. Analysis Within the LSR

1. Unique Habitats And Species

The following is the discussion and results of the Unique Habitat and Species module for the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA. For more information see Unique Habitats Maps, Unique Habitats and Species Table (page 117-120 or Appendix __), Forest Interior Map and Tables (Appendix 19), Riparian Reserves Map, Road Density tables

(Appendix 20). For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

a) Forest-wide Overview of Unique Habitats and Species:

(1) Unique Ecosystems Landscape Analysis

Each LSR/MLSA is compared Forest-wide for unique habitats and species abundance, connectivity and function (see Forest-wide Assessment Chapter VII, page 115-116). The Tieton LSR has one of the most diverse habitats on the Forest, as well as having a high degree of connectivity. The Lost Lake MLSA and Russell Ridge MLSA also have diverse habitats.

The most unusual thing about these areas are the high amounts on non-forest vegetation, (rock, talus and cliffs) with a high amount of riparian reserves.

Forest-wide the Tieton LSR is in the group of high quality unique habitats and species abundance, connectivity and function. The Lost Lake MLSA is moderate quality for habitat and species abundance, and in the lower group for connectivity and function of unique habitats. The Russell Ridge MLSA is in the moderate group for unique habitats and species abundance and function, and in the lower group for connectivity. Table VIII-12, Unique Habitats Overview by LSR/MLSA below describes some features of unique habitats and species analysis.

Table VIII-12, Unique Habitats Overview by LSR/MLSA

UNIQUE HABITATS	TIETON LSR	LOST LAKE MLSA	RUSSELL RIDGE MLSA
Total Acreage in LSR/MLSA	39,997 acres	6,946 acres	12,335 acres
Non-Forest Vegetation	14% (5,641 acres) *	18% (1,273 acres) **	13% (1,637 acres)
Riparian Reserves	16% (6,208 acres)	15% (1,075 acres)	14% (1,739 acres)
Late Successional/Wetter	60% (23,745 acres) * (10% SAF, 50% Moi/Wet)	25% (1.735 acres)	32% (3,992 acres)
Dense Dry Forest or Dry Late-successional Forest	8% (3,131 acres)	45% (3,156 acres)*	33% (4,048 acres)
Forest Interior	17% (6,747 acres)	11% (784 acres)*<	10% (1,236 acres)*<
Wildlife Species - Known L-S and PETS	65 species **	26 species	23 species
Plant Species - known PETS, S&M or L-S Associated species.	33 species *	28 species	29 species
Past Timber Harvest	low amounts,	moderate amounts	moderate amounts

UNIQUE HABITATS	TIETON LSR	LOST LAKE MLSA	RUSSELL RIDGE MLSA
Activities	10+%	>11%	>12%
Security Habitat	very low amounts 16% (6,297 acres)*<	very low amounts 18% (1,248 acres)*<	low amounts 26% 3,254 acres)
Open Road/Motorized Trail Density	moderate road/trail density, 2.46 miles per square mile	high road/trail density, 2.58 miles per square mile	moderate road/trail density, 2.38 miles per square mile
Roads and Trails in Riparian Reserves	high road/trail density, 2.84 miles per square mile	high road/trail density, 3.31 miles per square mile	high road/trail density, 3.89 miles per square mile

* high amounts Forest-wide, ** highest amounts on Forest, *< low amounts Forest-wide

The Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA are not within noted distribution centers of rarity and endemisim for animal and plant species, as per Columbia Basin Ecosystem Plan (Marcot et al, 1995 Draft). There are no Research Natural Areas within this group of LSR/MLSAs. There are no Special Interest Areas identified in the WNF Plan.

There are four special geological areas within this group of LSR/MLSAs: Kloochman Rock Potential Geological Area - Unique geological feature, within and adjacent to Lost Lake MLSA; Goose Egg Mountain Potential Geological Area - Unique geological feature, adjacent to Lost Lake MLSA and Russell Ridge MLSA; Rimrock Potential Geological Area - Unique geological feature, within Tieton LSR; and Blue Slide Potential Geological Area - Unique geological feature, within Tieton LSR.

Identified areas of high abundance, connectivity and function for unique habitats and species within the Tieton, Lost Lake and Russell Ridge LSR/ MLSAs are:

1. **TIETON LSR:**
    - **Divide Ridge (Tieton LSR/Lost Lake MLSA)** - White bark pine, Blue Slide and Rimrock Potential Geological Areas, talus/rock/cliff, Peregrine falcon eyrie, natural openings, gray wolf, connectivity, forest interior, riparian reserves headwaters, Forest Interior patches.
    - **South Fork Tieton** - Wetlands, open water, riparian reserves, meadows, Minnie Meadows aspen stand, deciduous forest, Forest Interior, spotted owl, talus/rock/cliffs, Blue Slide Potential Geological Area/Special Interest Area, Bull trout, refugia west slope cutthroat, scattered blocks of Security Habitat.
    - **Pinegrass Ridge** - Largest Forest Interior patch in LSR, largest block of Security Habitat in LSR, whitebark pine, riparian reserves, wetlands, rock/talus/cliffs.
    - **Mirriam Creek** - Pacific yew, spotted owl, connectivity with Wilderness, Forest Interior, wetlands, riparian reserves.

- **Clear Creek/Clear Lake/Indian Creek** - Wetlands, open water, riparian reserves, talus/rock/cliffs, spotted owl, patches of Forest Interior, Bull trout in Indian Creek.
- **Short and Dirty Creek/ Jay Hawks** -Riparian reserves, Forest Interior, whitebark pine, talus/rock/cliffs, natural openings, spotted owls, wetlands.
- **Rimrock Lake (Tieton LSR/Russell MLSA)** - Bald eagle nest, thermal areas.
- **Rattlesnake Meadows/Strawberry Meadows** - Connectivity.

2. **LOST LAKE MLSA**:
   - **Lost Lake/Chimney Peaks/Jumpoff Meadows** - Wetlands, riparian reserves, deciduous forest.
   - **Kloochman Rock** - Rock/talus/cliffs, Potential Geologic Area, PETS species.
   - **Pickle Prairie** - Wetlands, lakes, riparian reserves, deciduous forest, rock/talus/cliffs, sphagman bog, bog huckleberry, needs rehabilitation.
   - **Jumpoff Ridge** - Rock/cliffs/talus, natural openings, riparian reserves, security habitat, native rye grass, needs reduction knapweed.
   - **Tieton Basin** - Forest Interior, wetlands, riparian reserves, spotted frog, basalt bad for roads.
3. **RUSSELL RIDGE MLSA**
   - **Thunder Creek/Bethel Ridge (Russell Ridge MLSA/Rattlesnake LSR)** - Security habitat, forest interior, mountain goat, shrubs, alpine meadows, mountain hemlock thickets, riparian reserves.
   - **Upper Soup Creek** - Grand fir parkland, mountain goats, subalpine meadows, aspen, talus, black bears, elk, forest interior, spotted owls, riparian reserves, wetlands.
   - **Upper Wildcat** - Forest Interior, aspen, talus/scree/rock/cliffs, natural openings, wetlands, riparian reserves, west-slope cutthroat trout
   - **Russell Ridge/Russell Creek/Hart Creek** - Forest Interior, spotted owls, cotton wood, alder, riparian reserves, wetlands, rock, natural openings, rock/talus/cliffs, Sensitive plants.
   - **Westfall Rocks** - Ecologically unique, Goose Egg Mountain Potential Geological Area, see orchard, meadow, rock/talus/cliffs, seeps.

(2) Abundance and Ecological Diversity

Analysis for unique habitats and species abundance and ecological diversity includes acreage for unique plant and animal habitats, juxtaposition of habitats, availability of wilderness or areas of rarity, and known observations from the plant and animal species list. Compared to all the other LSR/MLSA's, the Tieton LSR provides among the highest amounts of unique habitats and variety of plant communities and environments. The Lost Lake and Russell Ridge MLSAs provide moderate amounts of unique habitat acreage and variety of plant communities and environments. See Forest-Wide LSR/MLSA Chapter VII pages 115-120, Unique Habitats and Species by LSR/MLSA.

(3) Connectivity for Unique Habitats and Species

Analysis for unique habitat connectivity includes the amount, percent and number of patches of late successional habitat, forest interior habitat patches, and the juxtaposition of wilderness and areas of rarity. This also includes past management activities. Compared to all the other LSR/MSLA's, the Tieton LSR has high quality connectivity in a landscape pattern for biological flow to sustain unique animal and plant communities. The Lost Lake and Russell Ridge MLSAs have lower quality connectivity.

(4) Process and Function of Unique Habitats and Species

Analysis for the function of habitats includes development and maintenance of unique ecosystems, including ecological values for unique species and populations. The plant and animal species list for known observations makes up a large part of this analysis, as well as proximity to wilderness and areas of rarity, which sustain habitat function. This also includes past management activities. The Tieton LSR is among the higher amounts of function, with 2 wilderness areas, the adjacent Yakama Indian Reservation, and two potential geological areas. The Lost Lake MLSA is in the lower group for providing quality functioning for unique species and habitat. The Russell Ridge MLSA is in the moderate group for providing function. See Chapter VII, Forest-Wide Function of the Network for Unique Habitats and Species and Table __ in Appendix __ Forest-wide Unique Habitats and Species by LSR/MLSA.

b) Unique Habitats and Species Known Within MLSA

(1) Unique Habitats and Species Site Specific Analysis

The following is a summary of the Unique Habitats and Species Module for the Tieton LSR, Lost Lake MLSA and Russell Ridge MLSA. For more information see "Forest-wide Unique Habitats and Species by LSR/MLSA" table in Appendix 37, Forest Interior Map and Tables (Appendix 19), Riparian Reserves and Roading Map and Tables (Appendix 20), Late Successional Habitat (Appendix 4 and 5) in the Forest-wide Assessment,. For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

Table VIII-13, Unique Habitats and Species Module Summary

Habitats and Species	Tieton LSR	Lost Lake MLSA	Russell Ridge MLSA
Riparian Reserves	Over-all 16% of LSR in riparian, high amounts.	Over-all 15% of LSR in riparian, moderate amounts.	Over-all 14% of LSR in riparian, moderate amounts.
	Streams (6208 acres), Open water (68 acres), Wet Meadows (318 acres), and Seeps.	Streams (1075 acres), Open water (25 acres), Wet Meadows (104 acres) a high amount, and Seeps.	Streams (1739 acres), Open water (108 acres), Wet Meadows (67 acres), and Seeps.
Non-Forested Vegetation	Total of 14% (5641 acres) of LSR, high amounts.	Total of 18% (1273 acres) of MLSA, highest percentage on the Forest.	Total of 13% (1637 acres) of MLSA.

Habitats and Species	Tieton LSR	Lost Lake MLSA	Russell Ridge MLSA
	Talus 8% (3273 acres), Rock 2% (731 acres), Cliff 1% (277 acres). High amount.	Talus 5% (321 acres), Rock 7% (469 acres), Cliff <1% (22 acres). Very high percentage.	Talus 5% (559 acres), Rock 4% (534 acres), Cliff <1% (71 acres). High amounts.
	Subalpine Meadows 0%, Dry Meadows (48 acres),	Subalpine Meadows trace % (4 acres), Dry Meadows (56 acres),	Subalpine Meadows trace % (7 acres), Dry Meadows (35 acres),
	Natural Openings 2% (821 acres), Shrub/Brushfields 0% (0 acres)	Natural Openings 3% (177 acres), Shrub/Brushfields 0% (0 acres)	Natural Openings 2% (242 acres), Shrub/Brushfields trace % (10 acres)
Unique Forest Groups	Forest Interior Patches 17% (6747 acres).	Forest Interior Patches 11% (784 acres) low amounts.	Forest Interior Patches 10% (1236 acres), low amounts.
	Late Successional Forest (wetter) 60% (23745 acres), high amount on Forest.	Late Successional (wetter) 25% (1735 acres).	Late Successional (wetter) 32% (3992 acres).
	Deciduous Trees <1% (141 acres), Aspen, Willow, Black Cottonwood.	Deciduous Trees 1% (100 acres), Aspen, Black Cottonwood.	Deciduous Trees trace % (10 acres), Aspen, cottonwood, alder.
	Disjunct forest - Alaska yellow cedar, western red cedar, Pacific yew.	Disjunct forest - western red cedar	Disjunct forest - Grand fir parkland in upper Soup Creek. Mountain hemlock thickets.
	Whitebark Pine/Subalpine Larch trace % (314 acres).	Whitebark Pine/Subalpine Larch 0 %,	Whitebark Pine/Subalpine Larch 0%,
	Snags/Logs high-moderate Quality from Landscape Level	Snags/Logs medium Quality from Landscape Level	Snags/Logs low to medium Quality from Landscape Level
Animal - Species of Special Status and Late Successional Associated Species	65 Animal Species Known to Occur in LSR/MLSA	26 Animal Species Known to Occur in LSR/MLSA	23 Animal Species Known to Occur in LSR/MLSA
Threatened, Endangered or Sensitive Species	7 Species: Spotted Owl, CHU, Bald Eagle, Peregrine falcon, Gray Wolf,	3 Species: Spotted Owl, CHU, Peregrine falcon.	2 Species: Spotted Owl, Bald Eagle.

Habitats and Species	Tieton LSR	Lost Lake MLSA	Russell Ridge MLSA
	Bull Trout, Common Loon.		
	9 Species of Concern: Wolverine, Fisher, Goshawk, Little Willow flycatcher, Olive sided flycatcher, Tailed frog, spotted frog, Cascade frog.	3 Species of Concern: Northern Goshawk, Spotted frog, Cascades frog.	4 Species of Concern: Northern Goshawk, Tailed frog, Spotted frog, Cascades frog.
Survey & Manage and Protection & Buffer	5 Species: Flammulated Owl, Black-backed woodpecker, White-breasted nuthatch, Pygmy nuthatch, Long-eared myotis.	0 Species:	2 Species: White-headed woodpecker, Black-backed woodpecker.
Management Indicator Species (WNF):	13 Species: Bald Eagle, Spotted Owl, Peregrine falcon, Pileated Woodpecker, 3-toed woodpecker, Primary Cavity Excavators, Ruffed Grouse, Marten, Beaver, Elk, Mule Deer, Mountain Goat, Cutthroat Trout.	10 Species: Spotted Owl, Peregrine falcon, Pileated Woodpecker, Primary Cavity Excavators, Marten, Ruffed Grouse, Elk, Mule Deer, Mountain Goat, Cutthroat Trout.	6 Species: Spotted Owl, Primary Cavity Excavators, Mountain Goat, Elk, Mule Deer, cutthroat trout.
Migratory Birds	1+ Species: along the streams, rivers, shrub fields, meadows. Barrow's Golden-eye, Common Merganser, Hammond's flycatcher. Introduced Wild Turkey.	0 + Species: along the streams, rivers, shrub fields, meadows.	1+ Species: along the streams, rivers, shrub fields, meadows. Introduced wild turkey.
Other Late Successional Associated	9+ Species: Barred owl, pygmy owl, saw-whet owl,	7+ Species: Pygmy owl, saw-whet owl,downy	5+ Species: pygmy owl, saw-whet owl, Cooper's hawk,

Habitats and Species	Tieton LSR	Lost Lake MLSA	Russell Ridge MLSA
	hairy woodpecker, Cooper's hawk, Sharp-shinned hawk, Vaux's swift, brown creeper, Northwest salamander, Long-toed salamander, flying squirrel, red-backed vole, Big-brown bat.	woodpecker, Long-toed salamander, flying squirrel, red-backed vole, Big-brown bat.	Williamson's sapsucker, Long-toed salamander,.
Significant Fish Populations	Fish Species: Bull trout in South Fork Tieton and Indian Creek, West slope Cutthroat refugia Discover to Fall Creeks.	Fish Species:.	Fish Species:.
Plants - Late Successional Associated Species and Species of Special Status			
PETS - Plants	2 species: *Cypripedium fasiculatum, Orbanche pinorum.*	0 species:	2 species: *Epipactis gigantea, Orbanche pinorum.*
Survey & Manage and Protection and Buffer Plants	Fungi (0 species), Lichens (0 species), Vascular Plants (0 species)	Fungi (0 species), Lichens (0 species), Vascular Plants (0 species)	Fungi (0 species), Lichens (0 species), Vascular Plants (0 species)
Other Plant Species.	State monitor species *Luina stricta*	State monitor species *Saxifraga intergrifolia* var *apetala*	
American Indian Uses	Traditional Use Sites: Dwelling/home sites and camp sites along Tieton River, Travel routes up and down valley, lithic scatters.	Traditional Use Sites: Lithic scatters.	Traditional Use Sites: Travel/hunting routes on ridges.
	Vision Quest Sites: Potential vision quest in rock and off major ridges	Vision Quest Sites: Potential vision quest in rock and off major ridges and peaks.	Vision Quest Sites: Potential vision quest in rock and off major ridges and peaks.

Habitats and Species	Tieton LSR	Lost Lake MLSA	Russell Ridge MLSA
	and peaks.		
	Traditional Food Plants:.	Traditional Food Plants:.	Traditional Food Plants:.
	Food Gathering: fishing, elk and deer hunting.	Food Gathering: fishing, elk and deer hunting.	Food Gathering: fishing, elk and deer hunting.

c) Tieton LSR, Lost Lake MLSA, Russell Ridge MLSA Potential Treatments For Unique Habitats And Species:

- **MONITOR**:
  1. Validate vegetation mapping of unique habitats.
  2. Monitor potential Geological Areas: Goose Egg Mountain, Blue Slide, Rimrock, and Kloochman Rock.
  3. Validate unique habitats assumptions, determine guild species use.
  4. Monitor, inventory and maintain high amounts of unique habitats and species (areas listed above);
  5. Monitor and maintain connectivity corridors. Provide habitat for wide ranging species, that LSR/MLSAs are only a portion of their range, i.e. gray wolf, wolverine and lynx.
  6. Survey & Manage prior to activities: Great Gray Owl, Larch Mt. Salamander, Lynx, Mollusks, fungi, lichen, bryophytes, vascular plants and other S&M or P&B species;.
- **WEEDS** (Knapweed, St. John's Wort, Tansy Ragwort, Oxeye Daisy, Scotch Broom, Canada Thistle, Chicory, Mullein):
  7. Keep weeds from encroaching into LSR/MLSA from trailheads and road sides, into meadows, natural openings, riparian areas, and sensitive plant sites (Russell Ridge, Soup Creek Meadow, seed orchard, Jumpoff Meadow/Ridge, Conrad Meadows, Minnie Meadows, Highway 12).
  8. Reduce noxious weed spread on roads and campgrounds through-out the LSR/MLSA;.
- **ROADS**
  9. Reduce roads in Forest Interior patches: South Fork Tieton, Indian Creek, Wildcat Creek.
  10. Reduce roads/trails/campgrounds in riparian reserves, and increase Security Habitat especially in Wildcat Creek, Lost Lake area, Short and Dirty Creek, South Fork Tieton, and Indian Creek.

11. Reduce roads and off road vehicles in mountain goat habitat
12. Reduce roads and trails in unique habitats: meadows, talus, wetlands.
13. Reduce open road/motorized trail density.
14. Do road access plan to allow lynx travel/denning/foraging habitats.
15. Retain American Indian access to traditional use sites;

- **HABITAT IMPROVEMENT**

16. Accelerate late successional habitat and forest interior habitat in Pickle Prairie, Clear Creek, Indian Creek, North Fork Tieton, South Fork Tieton, Soup Creek, and Wildcat Creek areas.
17. Accelerate old plantations towards late successional.
18. Increase fire climax/large trees in the dry forest type.
19. Reduce encroaching trees in some subalpine meadows and shrub fields; where fire historically maintained them as meadows (Fox Meadow, upper Soup Creek, Russell Ridge).
20. Reduce fragmentation of wet forest.
21. Pickle Prairie sphagnum bog, bog huckleberry, needs rehabilitation
22. Fence meadows on Russell Ridge, Minnie Meadows from elk and cattle grazing.
23. Use Prescribed Natural Fire for whitebark pine forests, shrub fields and subalpine meadows, in LSR/MLSAs and adjacent Wilderness areas.
24. Reduce impacts from elk herds, especially riparian reserves and areas to accelerate towards late-successional habitat.

- **PROTECT**

25. Reduce risk to fire in dry forest vegetation.
26. Protect and enhance riparian areas, wetlands, intermittent streams, and dispersal corridors in Riparian Reserves;
27. Protect large trees and screen near cliffs, caves, meadows;
28. Protect caves and cliff/caves for 250' around (roads/trails/cutting) to benefit bat species, mountain goats and peregrine falcon eyrie.
29. Protect 300' around subalpine meadows. Buffer around meadows.
30. Meet high end snag levels and spp

- **COORDINATE**

31. Coordinate fire hazard reduction in summer home area of Rimrock Lake.
32. Coordinate unique habitat management on DNR, WDF&W, and Yakama Indian Reservation lands outside the LSR, for habitat diversity and for connectivity.

33. Coordinate elk management, reduction of overgrazing effects on meadows and natural openings.

- **INTERPRET**

34. Interpret values and protect/maintain unique habitats and species, especially along Highway corridor and within campgrounds and trailheads.

d) Snag/Log/Green Tree Recruitment Module

The following is the discussion and results of the Snag/Log/Green Tree Recruitment sub-set module of the Unique Habitats module for the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA. Over-all, the Tieton LSR has a medium to high quality of available snags and future green tree recruitment snags and logs. The Lost Lake MLSA has a medium quality for snags/log/green tree recruitment. The Russell Ridge MLSA has a medium to low quality for snags/logs/green tree recruitment. See Appendix 1, Unique Habitats module and Snag sub-module, for order, explanations and process of modules. Snag quality can be judged by a continual supply of tree structure in various stages of decay, size and species. This can be best provided in the moist and wet vegetation groups, areas with large amounts of late-successional habitat, areas with little fragmentation, areas with high amounts of forest interior, and areas with high functioning riparian reserves. See "LSR/MLSA Snag/Downed Logs/Green Tree Recruitment Analysis", Appendix 38, Forest-wide Assessment.

Table --VIII-14--, Tieton LSR Snag Habitat Quality/Landscape Scale

HIGH QUALITY***	*MEDIUM QUALITY	LOW QUALITY
Moist & **W**et Veg Groups **65%**	**Subalpine Fir** & Mesic Veg 10%	**Dry** & **W**hitebark Veg 10%
>60% LS (non-dry) Habitat **60% ***	15% - 60% LS Habitat	<15% LS Habitat
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat **67%**	<40% LS/M Habitat
> 30% Forest Interior (non-dry)	15% -29% Forest Int Non-dry	<15% Forest Interior Not Dry **14%**
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry **2%**
>16% in Riparian Reserves **16%**	10% to 16% Riparian Reserves	<10% in Rip Res
0 Mi/Sq Mi Any Rds in Rip Res	0 to 1 Mi/Sq Mi Rds in Rip Res	> 1 Mi/Sq Mi Rd Rip Res **2.84 mi/sq/mi**
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads **2.46 mi/sq/mi**	> 2.5 Mi/Sq Mi Roads
>70% Security Habitat	50% to 70% Security Habitat	<50% Security Habitat **16% *<**
>10% Past Burns Provide Snags		<10% Past Burns Provide Snags **<10%**
>50% Insect/Pathogens (see Insect/Disease Write Up)	25% - 50% Insect/Pathogens **25-50%**	< 25% Insect/Pathogens

HIGH QUALITY***	*MEDIUM QUALITY	LOW QUALITY
<10% Past CC Harvest **8%**	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest **2%**	11% - 50% Past PC Harvest	>50% Past PC Harvest

* indicates high values Forest-wide, *< indicates low values Forest-wide.

(Percentages in bold indicate values for LSR/MLSA) *** indicates overall rating for snag quality.

Table VIII-15, Lost Lake MLSA, Snag Habitat Quality/Landscape Scale

HIGH QUALITY	MEDIUM QUALITY***	LOW QUALITY
Moist & Wet Veg Groups 27%	**Subalpine Fir** & Mesic Veg 1%	**Dry** & Whitebark Veg **54%**
>60% LS (non-dry) Habitat	15% - 60% LS Habitat **25%**	<15% LS Habitat
80% - 100% LS (all) Habitat **70%**	40% - 80% LS/M Habitat	<40% LS/M Habitat
> 30% Forest Interior (non-dry)	15% -29% Forest Int Non-dry	<15% Forest Interior Not Dry **0.4% **<**
>10% Forest Interior Dry **11%**	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry
>16% in Riparian Reserves	10% to 16% Riparian Reserves **15%**	<10% in Rip Res
0 Mi/Sq Mi Any Rds in Rip Res	0 to 1 Mi/Sq Mi Rds in Rip Res	> 1 Mi/Sq Mi Rd Rip Res **3.31 mi/sq/mi**
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads	> 2.5 Mi/Sq Mi Roads **2.58 mi/sq/mi**
>70% Security Habitat	50% to 70% Security Habitat	<50% Security Habitat **18% *<**
>10% Past Burns Provide Snags		<10% Past Burns Provide Snags **<10%**
>50% Insect/Pathogens (see Insect/Disease Write Up)	25% - 50% Insect/Pathogens **25-50%**	< 25% Insect/Pathogens
<10% Past CC Harvest **9%**	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest	11% - 50% Past PC Harvest **11-50%**	>50% Past PC Harvest

**< indicates lowest values, Forest-wide.

(Percentages in bold indicate values for LSR/MLSA) *** indicates overall rating for snag quality.

Table VIII-16, Russell Ridge MLSA Snag Habitat Quality/Landscape Scale

HIGH QUALITY	MEDIUM QUALITY*	**LOW QUALITY

HIGH QUALITY	MEDIUM QUALITY*	**LOW QUALITY
Moist & **Wet** Veg Groups 39%	**Subalpine Fir** & Mesic Veg 3%	**Dry** & Whitebark Veg **44%**
>60% LS (non-dry) Habitat	15% - 60% LS Habitat **32%**	<15% LS Habitat
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat **65%**	<40% LS/M Habitat
> 30% Forest Interior (non-dry)	15% -29% Forest Int Non-dry	<15% Forest Interior Not Dry **4%**
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry **6%**
>16% in Riparian Reserves	10% to 16% Riparian Reserves **14%**	<10% in Rip Res
0 Mi/Sq Mi Any Rds in Rip Res	0 to 1 Mi/Sq Mi Rds in Rip Res	> 1 Mi/Sq Mi Rd Rip Res **3.89 mi/sq/mi**
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads **2.38 mi/sq/mi**	> 2.5 Mi/Sq Mi Roads
>70% Security Habitat	50% to 70% Security Habitat	<50% Security Habitat **26%** (*low amt, but best on District, WODW)
>10% Past Burns Provide Snags		<10% Past Burns Provide Snags **<10%**
>50% Insect/Pathogens (see Insect/Disease Write Up) **>50%**	25% - 50% Insect/Pathogens	< 25% Insect/Pathogens
<10% Past CC Harvest	11% - 25% Past CC Harvest **12%**	>25% Past CC Harvest
<10% Past PC Harvest	11% - 50% Past PC Harvest **11-50%**	>50% Past PC Harvest

(Percentages in bold indicate values for LSR/MLSA) *** indicates overall snag quality.

(1) Restoration Opportunities And Potential Projects For Snags/Logs

1. Accelerate late successional habitat and forest interior habitat in Pickle Prairie, Clear Creek, Indian Creek, North Fork Tieton, South Fork Tieton, Soup Creek, and Wildcat Creek areas.
2. Accelerate old plantations towards late successional.
3. Reduce roads in Forest Interior patches: South Fork Tieton, Indian Creek, Wildcat Creek.
4. Reduce roads/trails/campgrounds in riparian reserves, and increase Security Habitat especially in Wildcat Creek, Lost Lake area, Short and Dirty Creek, South Fork Tieton, and Indian Creek.
5. Monitor for snag dependent species, and snag longevity, especially in old plantations.

6. Complete snag analysis on 40 acre grid prior to any reduction of forest structure habitat. Retain snags at high end of range. Manage insects and disease at endemic levels.

e) Species with Special Status (Plant)

Within the Tieton LSR and Lost Lake and Russell Ridge MLSAs, there is potential habitat for a number of special status species, however, few surveys have been carried out to determine presence or absence. Surveys should be carried out in conjunction with restoration projects, as well as surveys independent of other activities. It is important that species ranges are known so that better estimates of species viability can be assessed. In addition, little is known about most rare species habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

There are two Forest Service sensitive species (*Cypripedium fasciculatum* and *Orobanche pinorum*) and one Washington state monitor species (*Luina stricta*) within the Tieton LSR. There are no documented occurrences of Forest Service sensitive species from the Lost Lake MLSA. However, one Washington state monitor species has been documented (*Saxifraga intergrifolia* var *apetala*) from this area. Two Forest Service sensitive species are documented from the Russell Ridge MLSA (*Epipactis gigantea* and *Orobanche pinorum*). Information regarding the biology or ecology of these species is limited, but some information is summarized here.

Cypripedium fasciculatum occurs at low to upper elevations in moist to rather dry woods and coniferous forest. *Epipactis gigantea* occurs in seeps and springs in otherwise very dry areas. *Orobanche pinorum* is documented from dry, hot exposed areas on very thin soils. *Luina stricta* is well documented and relatively common on the Naches Ranger District..

f) Survey and Manage Species (Plant)

There is a limited number of survey and manage plant species documented from the Tieton LSR, Lost Lake and Russell Ridge MLSAs. (Appendix 7). Several species are suspected to occur in both areas. (Appendix 7). The ROD provides standards and guidelines for survey and manage species, and these should be addressed within the LSR/MLSAs. An important point is that only very general surveys have been completed for non-vascular plants and projects should be initiated which carry out surveys which comply with current direction and survey protocol.

2. Plant Connectivity

Connectivity can also be addressed by analyzing the connectedness of habitats or species populations within the MLSA/LSR. Within the Tieton LSR, Lost Lake and Russell Ridge MLSAs, most forest groups are relatively well connected. Disjunct species populations result from inherent breaks or openings in the landscape. At this time, information is not available to complete this type of analysis for survey and manage species within the Tieton LSR, Lost Lake and Russell Ridge MLSAs.

3. Wildlife Connectivity

a) Wildlife Connectivity for the Lost Lake MLSA

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Lost Lake MLSA.

Table VIII-17, Connectivity Rankings for Lost Lake MLSA

Connectivity Variable	Dry	MGF	SAF	RR	Overall
% Late-success or Fire Climax	L	H	H	H	H
Open Road Density	L	L	L	L	L
Security Habitat	L	L	L	L	L
Forest Interior Roads	L	L	L	L	
% Forest Interior*	L	L	L	L	L

Currently, the availability of habitat in a late-successional or fire-climax condition is high in all vegetation groups except the dry forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density and level of security habitat provides for a low level of connectivity. The current level of forest interior connectivity is considered to be low, as a result of habitat patches being fragmented by roads. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities

(a) Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Moist Grand Fir, Subalpine Fir, Riparian Reserves

There is an opportunity to improve the connectivity within the moist grand fir, subalpine fir, and riparian reserves by reducing the level of roads in the forest interior patches.

b) Wildlife Connectivity for the Tieton LSR

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Tieton LSR.

Table VIII-18, Connectivity Rankings for Tieton LSR

Connectivity Variable	Dry	MGF	WET	SAF	RR	Overall
% Late-success or Fire Climax	L	H	H	H	M	**M**
Open Road Density	L	L	L	L	L	**L**
Security Habitat	L	L	L	L	L	**L**
Forest Interior Roads	L	L	L	L	L	**L**
% Forest Interior*	L	L	L	L	L	**L**

Currently, the availability of habitat in a late-successional or fire-climax condition is high in all vegetation groups except the dry forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density

and level of security habitat provides for a low level of connectivity. However, the existing roads are concentrated in Riparian Reserves where the current open road density is 2.5 miles/sq mi.. The current level of forest interior connectivity is considered to be low, as a result of habitat patches being fragmented by roads. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities

(a) Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Moist Grand Fir, Wet Forest, Subalpine Fir, Riparian Reserves

There is an opportunity to improve habitat connectivity within riparian reserves and interior forest patches by reducing the number of roads. This could include relocating roads or revegetating them to provide for connectivity for low mobility wildlife species.

c) Wildlife Connectivity for the Russell Ridge MLSA

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Russell Ridge MLSA.

Table VIII-19, Connectivity Rankings for Russell Ridge MLSA

Connectivity Variable	Dry	MGF	WET	SAF	RR	Overall
% Late-success or Fire Climax	L	M	H	H	M	**M**
Open Road Density	L	L	L	L	L	**L**
Security Habitat	L	L	L	L	L	**L**
Forest Interior Roads	L	L	L	L	L	**L**
% Forest Interior*	L	L	L	M	L	**L**

Currently, the availability of habitat in a late-successional or fire-climax condition is high in the wet and subalpine fir forests, moderate in the moist grand fir, and low in the dry forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density and level of security habitat provides for a low level of connectivity. However, the existing roads are concentrated in Riparian Reserves where the current open road density is 4.2 miles/sq mi.. The current level of forest interior connectivity is considered to be low, as a result of habitat patches being fragmented by roads. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also necessary to more adequately address connectivity for the less

mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities

(a) Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Moist Grand Fir, Wet Forests, Subapline Fir, Riparian Reserves

There is an opportunity to improve habitat connectivity within riparian reserves and interior forest patches by reducing the number of roads. This could include relocating roads or revegetating them to provide for connectivity for low mobility wildlife species. In addition, silvicultural methods could be used to promote the development of late-successional forest structures in areas not currently in a late-successional condition.

4. Disturbance Risk Analysis

Sixty seven percent of the 39,997 acre Tieton LSR, 70% of the 6,946 acre Lost Lake MLSA and 65 % of the 12,335 acre Russell Ridge MLSA contain late-successional forest; however 55% of the LSR (21,916 acres) and 73% (5,069 acres) and 63% (7,726 acres) of the two MLSAs are in low sustainability vegetation types. Twenty-one percent of the Tieton LSR, 14% of the Russell Ridge MLSA and none of the Lost Lake MLSA is within the wet forest group. Large portions of the three reserves are at risk to fires because of the risk of both human and natural ignitions as well as from vegetation compositions and structures.

In addition to the danger from fires, all three reserves are currently impacted by serious root disease problems that are contributing to increased mortality and fuel buildups. *Phellinus weirii* and *Heterobasidion annosum* (laminated root rot and annosus root disease) are the two major pathogens involved. These root decay pathogens are affecting vegetation in the dry forest group and in the mesic western hemlock and moist grand fir vegetation types which make up 44% of the Tieton LSR, 73% of the Lost Lake MLSA, and 63% of the Russell Ridge MLSA. In addition, annosus root disease is scattered throughout the wet forest group, especially in stands dominated by mountain hemlock.

Dwarf mistletoes are a problem in Douglas-fir growing on drier sites. Larch mistletoe is a scattered problem, especially on drier sites where it tends to accelerate successional trajectories by eliminating large, old individuals of western larch. White pine blister rust is found in all three reserves from the moist grand fir type throughout the mesic hemlock and wet types. Blister rust is also found in the few scattered pockets of whitebark pine within the three reserves. In white bark pine forests, blister rust tends to kill one or several of the multiple stems of a tree, but rarely kills the entire tree.

Western spruce budworm outbreaks occurred in the dry forest and moist grand fir vegetation groups during the mid 1980s. The area was sprayed to control the outbreak in 1987. Western spruce budworm outbreaks occurred in all 3 reserves and in adjacent dry and moist vegetation types, especially those surrounding Rimrock Lake. Many areas in the three reserves continue to be at risk to future outbreaks, since stand compositions and structures have not changed appreciably since the last outbreak. Fir engraver mortality is currently extremely high, especially in stands where budworm outbreaks occurred and/or where root diseases are a problem. Douglas fir beetle mortality is localized and tends to occur in dry, dense forest types; it is associated with root disease and mistletoe infestation. Western pine beetle is killing large pines in overstocked stands along highway 12. Mountain pine beetle mortality is scattered and limited to overstocked stands; the potential exists for

more widespread mortality, especially in stands outside, but adjacent to the reserves. Outbreaks occurring in stands adjacent to the reserves could affect trees growing within reserve boundaries as well. In 1989 and 1990, mortality associated with the mountain pine beetle was extremely heavy in whitebark pine growing within the LSR and MLSAs. Affected trees were probably already stressed from blister rust infections. Aerial surveys in and around the reserves report that thousands of trees were killed during those two years; in prior and subsequent years mortality levels were lower, but still impacted hundreds of trees. Although reported mortality of western white pine now appears to be declining, the decline is more a function of the lack of live western white pine than anything else.

Portions of the three reserves have been heavily grazed by both domestic livestock and elk. At the turn of the century, grazing pressure was extremely high, and mainly from sheep. Current livestock grazing appears to be at a level that does not greatly impact ecological processes or functions; however there remain considerable problems associated with past livestock and current elk grazing. Most current damage is a result of overgrazing by elk. Elk herds are kept at unnaturally high levels as a result of social pressures, especially from hunters. Elk herds are maintained throughout the winter at state feeding stations. Deer and elk grazing and browsing have eliminated the shrub component of stands in some areas. Past and present grazing effects include replacement of native grasses by introduced species or noxious weeds. In addition, soil compaction associated with high grazing levels is changing forests from more mesic to drier types. This is particularly true where multiple harvests have occurred in flatter, drier portions of the reserves and in meadows, including higher elevation, wet meadows.

The following information on insect activity in the Tieton LSR, Lost Lake MLSA, and Russell Ridge MLSA is from data collected during the aerial surveys conducted by Region 6 Insect and Disease Group. Light infestations or damage on less than 100 acres are not reported. Past insect data for this LSR extends back only to 1980.

- Mountain pine beetle (whitebark pine): 1988, 1989-90 (extremely heavy), 1995
- Mountain pine beetle (western white pine): 1980, 1982, 1985-86, 1988, 1992-93, 1995
- Mountain pine beetle (lodgepole pine): 1988-89,
- Larch budmoth: 1985
- Fir engraver: 1989-91, 1993-95
- Douglas-fir beetle: 1988-89
- Western pine beetle: 1981,
- Western spruce budworm: 1984-87
- Blackheaded budworm: 1985

Susceptibility of the Tieton LSR , Lost Lake MLSA and Russell Ridge MLSA to fires, insects, and pathogens are shown in the following tables. Mortality from biotic disturbance agents will be greatest where host continuity across the landscape is high and where there is overlapping moderate to high risk among two or more disturbance agents that act synergistically. Risk associated with biotic disturbance agents generally elevates the risk of catastrophic fires by potentially increasing fuel levels; this is especially true in the dry forest vegetation group and in vegetation upslope from or surrounded by dry forests.

Table VIII-20, Disturbance Matrix for Tieton LSR / Lost Lake MLSA

Veg Type	Fire	Dwarf Mistletoe		Root Disease									Total
		DF	WL	AROS	HEAN	PHWE	WPBR	WSB	DFB	FE	MPB	WPB	
10	L	L	-	M	M	M	-	L	L	L	L	L	L

Veg Type	Fire	Dwarf Mistletoe		Root Disease									Total
		DF	WL	AROS	HEAN	PHWE	WPBR	WSB	DFB	FE	MPB	WPB	
11	M	M	L	M	M	M	-	M	L	L	L	L	M
12	H	H	L	M	M	H	-	H	H	H	L	H	H
13	H	H	L	H	H	H	-	H	M	H	M	H	H
30	M	M	M	M	M	M	H	L	L	L	-	L	M
31	M	M	M	M	M	M	H	L	L	M	M	L	M
32	H	H	H	L	H	H	H	H	M	H	M	M	H
33	H	H	H	M	H	H	H	H	M	H	M	M	H
34	M	M	M	M	M	M	H	L	L	L	-	L	M
35	M	M	M	M	M	M	H	L	L	M	-	L	M
36	H	H	H	L	H	H	H	M	M	H	-	L	H
37	H	H	H	M	H	H	H	M	M	H	-	L	H
40	L	L	L	L	L	L	M	L	L	L	-	L	L
41	H	L	L	L	L	L	H	L	L	L	H	L	H
42	H	L	L	L	M	L	H	L	M	M	H	M	H
60	M	L	L	L	M	M	H	L	L	L	-	L	M
61	M	L	L	L	M	M	H	L	L	L	-	L	M
62	M	L	L	L	M	M	H	L	M	M	-	L	M
64	L	L	L	L	M	M	H	L	L	L	-	L	L
65	L	L	L	L	M	M	H	L	L	L	-	L	L
71	M	-	-	L	L	L	M	L	L	M	M	L	M

Key to Column Headings: PP = Ponderosa Pine, DF = Douglas-fir, WL = Western Larch, PIPO = Ponderosa Pine; PSME = Douglas-fir; LAOC = Western Larch; AROS = Armillaria root disease; HEAN = Annosus root disease; WPBR = White Pine Blister Rust; WSB = Western Spruce Budworm; DFB = Douglas-fir Beetle; MPB = Mountain Pine Beetle; WPB = Western Pine Beetle.

Key to Letters "-" = no risk = 0; "L" = low risk, "M" = moderate risk, "H" = high risk

Veg Type codes: refer to Appendix 3, in the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas, Wenatchee National Forest".

Table VIII-21, Disturbance Matrix for Russell Ridge MLSA

Veg type	Fire	Dwarf Mistletoe		Root disease								Total
		DF	WL	AROS	HEAN	PHWE	WPBR	WSB	DFB	FE	MPB	
10	L	L	-	M	M	M	-	L	L	L	L	L
11	M	M	L	M	M	M	-	M	L	L	L	M
12	H	H	L	M	M	H	-	H	H	H	L	H
13	H	H	L	H	H	H	-	H	M	H	M	H
30	M	M	M	M	M	M	H	L	L	L	-	M
32	H	H	H	L	H	H	H	M	M	H	M	H
33	H	H	H	M	H	H	H	M	M	H	M	H
42	H	L	L	L	M	L	H	L	M	M	H	H
60	M	L	L	L	M	M	H	L	L	L	-	M
62	M	L	L	L	M	M	H	L	M	M	-	M

Key to Column Headings: PP = Ponderosa Pine, DF = Douglas-fir, WL = Western Larch, PIPO = Ponderosa Pine; PSME = Douglas-fir; LAOC = Western Larch; AROS = Armillaria root disease; HEAN = Annosus root disease; WPBR = White Pine Blister Rust; WSB = Western Spruce Budworm; DFB = Douglas-fir Beetle; MPB = Mountain Pine Beetle; WPB = Western Pine Beetle.

Key to Letters "-" = no risk = 0; "L" = low risk, "M" = moderate risk, "H" = high risk

Veg Type codes: refer to Appendix 3, in the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas, Wenatchee National Forest".

Opportunities exist for commercial thinning to create open stands of large pine and western larch along the highway 12 corridor, the 1500 road, and the 1200 road that circles Rimrock lake. Much large structure remains in the currently overstocked stands, providing an opportunity for returning these stands to historical ranges of variability and thus reducing the risk to catastrophic fires. Because root disease is a major problem within the three reserves, altering species composition to favor resistant species is necessary to ensure long term sustainability. Breaking up below-ground continuity of host species root systems is required to reduce the impact of root decay organisms throughout the reserves. Below-ground continuity of susceptible species can be reduced by allowing group selection harvests of fir and hemlock between 0.5 to 2 acres and regenerating with ponderosa pine and western larch. Options for decreasing stand density and increasing sustainability within fire-susceptible vegetation types include thinning (PCT/CT); pruning; fuelwood collection; mechanical fuel treatments; handpiling fuels; prescribed fire; and favoring the seral, fire-resistant species such as ponderosa pine, and western larch.

5. Northern Spotted Owl

The following is the discussion and results of the within LSR/MLSA Spotted Owl Module for the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA. There are a total of 13 spotted owls in these 3 LSR/MLSAs, and an additional 4 more pairs adjacent to the areas. The Tieton LSR and the Russell Ridge MLSA have primarily wetter forest habitat. The Lost Lake MLSA is primarily drier forest habitat. The spotted owl module reviews the home range sites for spotted owls, the spotted owl pair goals for LSR/MLSAs, as well as connectivity within the LSR/MLSAs. . See Table 3 ?, "Individual LSR/MLSA Spotted Owl Analysis and Objectives", for home range acreage needs, pair goals and existing status of spotted owl pairs. Appendix 1 further describes the order, explanations and process of modules, specifically the "Northern Spotted Owl Module, Individual LSR/MLSA". Also see Suitable Spotted Owl/Dispersal Habitat and Activity Center map and tables, Forest Interior Map and tables, Riparian Reserve map and tables and Security Habitat map and tables.

Table VIII-22, Individual LSR/MLSA Spotted Owl Analysis and Objectives: Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA

WNF LSR & MLSA	LSR/MLSA IN DRY OR WETTER FOREST VEG	SPOTTED OWL PAIR HOME RANGE ACREAGE FOR LSR OR MLSA	S.OWL PAIRS, to MAINTAIN EXISTING OR CHU GOALS?	EXISTING S.OWL PAIRS LSR & MLSA	# OF POTEN-TIAL, SUSTAIN-ABLE OWLS

	DRY LSR OR MLSA	WET LSR OR MLSA	Thre-shold 2,663 ac per Pair	Ind Owl is Wet or Dry	Tar-get 3,994 ac per Pair	Main-tain Exist-ing # Pr	Meet CHU Goal # Pr	# Spotted Owl Pairs Known as of 1996 Field Season	# Pairs (2663a) Sustainable Based on Potential Wetter Habitat
Russell MLSA		Wet	Yes			2 Pair		2 Pairs	2 Pairs
Tieton LSR		Wet		Yes	X		6+ Pairs	10 Pairs	11 Pairs Theshold (7 Pairs Target)
Lost Lake MLSA	Dry		Yes				1 Pair	1 Pair	1 Pair

LSRs and MLSAs are important for maintaining well distributed and well-connected spotted owl populations. The recovery of the federally Threatened northern spotted owl is highlighted in management strategies within LSRs and MLSAs (See appendix 1 - Northern Spotted Owl Module, Individual LSR/MLSA). Protection and enhancement of habitat includes providing late successional and old growth forest ecosystems, and habitat for late successional forest related species, including the northern spotted owl (NWFP A-4, 1994). Spotted owl management strategies include:

- LSRs and MLSAs will meet the goals for the numbers of owl pairs within each LSR or MLSA (NWFP 1994 B-4; NWFP C-9; FSEIS Appendix G, Biological Opinion, 1994; USDI. 1992. Northern Spotted Owl Recovery Plan, and USFWS Memorandum, 1991);
- Each spotted owl's 100 acre Activity Center will have the best quality habitat established and retained;
- Each spotted owl's 500 acre Core Area will have the best quality habitat and habitat will be retained;
- Each spotted owl home range will meet threshold acreage's (2,663 acres) as a minimum. Wetter owl sites in LSRs well meet target or optimal habitat of 3,994 acres.;
- Sustainable/suitable spotted owl habitat outside home ranges will be maintained ;
- Dispersal habitat within and outside LSR/MLSA will be provided; (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).
- Habitat conditions for long-term (> 50 years) sustainable nesting/roosting/foraging habitat will be improved (see DECs and DCs in Forest-wide document, Chapter III PP 87-95); and
- The risk of habitat loss and nest site loss will be reduced (NWFP 1994, C-12 to 16, C-26);

The Tieton LSR is primarily in wetter forest habitats (65% of LSR).There are 10 spotted owl sites within the Tieton LSR. Of the 10 sites, there are 9 spotted owl sites on wetter forests. The Desired Condition for "wetter" spotted owl home ranges in LSRs is 60% of the 1.8 mile home range radius, which is 3,994 acres. There is 1 dry owl site in the LSR, SO841 South Fork Tieton. The Desired Condition for the "dry" spotted owl home ranges within LSRs is 40% of the home range, which is

2,663 acres. The Tieton LSR is a wetter LSR, which will manage for spotted owl habitat, over risk and hazard reduction. The LSRs, in general, accept more risk from fire than does management in MLSAs

The Lost Lake MLSA is primarily in the Dry forest habitats (54%). The Russell Ridge MLSA is in a mixture of dry (44%) and wetter (37%) forest habitats. The Desired Condition for spotted owls in MLSAs, is 40% of the home range, within 1.8 mile radius, which is 2,663 acres. See description of habitat in DECs, Chapter VII page 92-95. Dry spotted owl sites in LSRs, and all MLSAs will be managed for risk and hazard reduction over spotted owl habitat maintenance (after meeting threshold acreage goals). The MLSAs, in general, accept more risk from fire, than does management in Matrix.

The Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA together have 13 activity centers for spotted owls. There are four main cluster groups for these owls. One group is in the South Fork Tieton area (5 owl pairs). One cluster is in the Clear Lake area (3 owl pairs, plus 3 adjacent pairs). There is one cluster in the Lost Lake to Short-and-Dirty Creek areas (you gotta love these names!), (this cluster has 3 pairs, plus one adjacent pair). The last group is clustered in the Russell/Wildcat/Soup Creek areas (2 pairs). Clusters of owls provide better function for LSR and species recovery, than do isolated owl sites.

Though private and non-federal lands are sometimes within LSR/MLSA boundaries, they do not apply towards management for late-successional habitat. There are two private land parcels within the LSR/MLSA (Dog Lake and the head of Short and Dirty Creek). Private lands, DNR lands and Yakama Tribal lands adjoin the south and east boundary of the LSR/MLSA (20 mile length). Forest harvest actions on DNR, Yakama or private lands outside the LSR/MLSA might affect one of the LSR/MLSA owl, Lost Lake owl SO807. These non-federal land parcels could have coordination of habitat and site management.

a) Suitable Spotted Owl Habitat

(1) Tieton LSR - Spotted Owl Habitat

The existing amount of nesting/roosting/foraging habitat within the Tieton LSR is 25,587 acres (64%) of spotted owl habitat. There are currently 10 pairs of spotted owls in this LSR. The existing habitat could support 9+ pairs of spotted owls at threshold acreage (2,663 acres/pair) or 6+ pairs at target amounts (3,994 acres/pair). See Table 4?, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs", which displays the potential number of owl pairs for the various scenarios. The LSR is predominately in the moist forest groups, with some wet forest and some multi-structure subalpine fir forests. This wetter spotted owl habitat has a higher chance of Sustainability, than dry and mesic forest groups. There is 10 % dry forests, and no mesic forest groups in this LSR.

There is potential for spotted owl habitat to reach 32,747 acres (82%) in Tieton LSR. This includes 3,500 acres, that are currently in created opening or sapling/pole, which will grow into suitable spotted owl habitat in the next 50 to 120 years. These acreage's should be accelerated towards late successional habitat.

Sustainable spotted owl habitat could be 29,616 (74%) in the moist, wet and multi-story subalpine fir forests. This habitat would be sustainable over time (50+ years). The LSR currently supports 10 pairs of spotted owls, over time it could sustain 7.4 pairs of owls with target acreage (3,994 acres/pair). The goal of this LSR is to support 6+ pairs, this is very likely.

Dispersal habitat (which may grow into foraging, roosting and nesting), covers 3,402 acres (9%) of Tieton LSR. It is predominately in moist forest group, with some mix of the others. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and Suitable Spotted Owl

Habitat Maps). The most contiguous and sustainable suitable spotted owl habitat in the LSR is from Corral Creek to North Fork Tieton, from Phantom Lake to Spruce Creek, Miriam Creek, North Fork Clear Creek, Sand Ridge/Indian Creek (See Forest Interior Map and Suitable Spotted Owl Habitat Map). There is much dispersal habitat in wilderness areas, dispersal habitat in these areas should be allowed to advance successionally, to provide added owl habitat.

Potential disruption to spotted owl habitat from risk of fire is moderate. There has been disruption of habitat from forest fragmentation due to past harvest activities. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl dispersal habitat within some spotted owl core areas and home ranges. The fire risk reduction should occur on matrix lands outside the LSR.

Habitat analysis for the Tieton LSR/Russell Ridge MLSA/Lost Lake MLSA is based on vegetation mapping, and a model of spotted owl habitat structure. The map and acreage's should be validated prior to project implementation.

(2) Lost Lake MLSA - Spotted Owl Habitat

The existing amount of nesting/roosting/foraging habitat within the Lost Lake MLSA is 3,588 acres (52%). There is 1 pair of spotted owls. The existing habitat could support 1.4 pairs of spotted owls at threshold acreage. See Table 4?, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs". The MLSA is predominately in the Dry forest group (44%), with some moist forest (27%). The moist spotted owl habitat has a higher chance of Sustainability, than does the dry forest.

There is potential for spotted owl habitat to reach 5,112 acres (74%) in Lost Lake MLSA. This includes 200 acres, that are currently in created opening or sapling/pole, which will grow into suitable spotted owl habitat in the next 50 to 120 years. In the moist/wet forests these acreage's should be accelerated towards late successional habitat.

There is a large difference between existing, potential and sustainable spotted owl habitat in the Lost Lake MLSA. Sustainable spotted owl habitat could be 1,956 acres (as low as 28%) in the moist, wet and multi-story subalpine fir forests. This habitat would be sustainable over time (50+ years). The MLSA currently supports 1 pair of spotted owls, over time it could sustain 0.7 pairs of owls with threshold acreage (2,663 acres/pair). The goal of this MLSA is to support 1 pair, habitat will be augmented from the Tieton LSR to the west. The current owl location may move, over-time to the wetter habitat towards the west..

Dispersal habitat covers 1,420 acres (20%) of Lost Lake MLSA. It is predominately in dry forest groups. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and Suitable Spotted Owl Habitat Maps). The most contiguous and sustainable suitable spotted owl habitat in the MLSA is in the Pickle Prairie to Golden Meadows area (See Forest Interior Map and Suitable Spotted Owl Habitat Map). There is much dispersal habitat on DNR lands beyond Louie Way Gap..

Potential disruption to spotted owl habitat from risk of fire is moderate to high. There has been disruption of habitat from forest fragmentation due to past harvest activities. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl dispersal habitat within some spotted owl core areas and home ranges. The fire risk reduction should occur on matrix lands outside the MLSA, and within the MLSA but outside of threshold habitat acreage.

(3) Russell Ridge MLSA - Spotted Owl Habitat

The existing amount of nesting/roosting/foraging habitat within the Russell Ridge MLSA is 6,042 acres (49%). There are 2 pairs of spotted owls. The existing habitat could support 2.3 pairs of spotted

owls at threshold acreage. See Table 4?, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs". The MLSA is in a mix of dry and moist forests. The moist spotted owl habitat has a higher chance of Sustainability, than does the dry forest.

There is potential for spotted owl habitat to reach 9,323 acres (76%) in Russell Ridge MLSA. This includes 1400 acres, that are currently in created opening or sapling/pole, which could grow into suitable spotted owl habitat in the next 50 to 120 years. In the moist/wet forests, these acreage's should be accelerated towards late successional habitat.

There is a large difference between existing, potential and sustainable spotted owl habitat in the Russell Ridge MLSA. Sustainable spotted owl habitat could be 5,275 acres (as low as 43%) in the moist, wet and multi-story subalpine fir forests. This habitat would be sustainable over time (50+ years). The MLSA currently supports 2 pairs of spotted owls, over time it could sustain 2.0 pairs of owls with threshold acreage (2,663 acres/pair). The goal of this MLSA is to support 2 pairs, this is likely, but over time the locations may be in the wetter forest types to the west and north. Some of the MLSA is in wetter habitat within Wilderness.

Dispersal habitat covers 2,758 acres (22%) of Russell Ridge MLSA. It is predominately in dry and moist forest groups. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and Suitable Spotted Owl Habitat Maps). The most contiguous and sustainable suitable spotted owl habitat in the MLSA is in Wildcat/Kitten/Thunder Creeks area (See Forest Interior Map and Suitable Spotted Owl Habitat Map). The adjacent wilderness habitat is contiguous with this MLSA.

Potential disruption to spotted owl habitat from risk of fire is moderate to high. There has been disruption of habitat from forest fragmentation due to past harvest activities. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl dispersal habitat within some spotted owl core areas and home ranges. The fire risk reduction should occur on matrix lands outside the MLSA, and within the MLSA but outside of threshold habitat acreage.

Table VIII-23, Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs.

LSR or MLSA	1996 Known Pairs & Singles	CHU S.Owl Pair Goals	Existing Suitable Spotted Owl Habitat			Potential Suitable Spotted Owl Habitat			Sustainable Suitable Spotted Owl Habitat			% Forest Inter-ior
			Acres	Thresh old Pairs	Target Pairs	Acres	Thresh old Pair	Target Pairs	Acres	Thresh old Pairs	Target Pairs	
Crow DM14	5 sites +1[1] WILDERNESS	--	9950	3.7	NA	11198	4.2	NA	10786	4 +wild	NA	28%
Bumping RW126	4 sites + 4[1] WILDERNESS	4+ Pr	9238	3.5 Pairs	2.3 Pairs	13126	4.9 Pairs	3.3 Pairs	12961	4.9 Pairs	3.2 Pairs	48%
Rattlesnak RW128	3 sites	2+ Pr	5632	2.1	1.4	7082	2.7	1.8	6525	2.5	1.6	11%
Russell DM11	2 sites WILDERNESS	--	6042	2.3	NA	9323	3.5	NA	5275	2.0	NA	10%

LSR or MLSA	1996 Known Pairs & Singles	CHU S.Owl Pair Goals	Existing Suitable Spotted Owl Habitat			Potential Suitable Spotted Owl Habitat			Sustainable Suitable Spotted Owl Habitat			% Forest Interior
			Acres	Threshold Pairs	Target Pairs	Acres	Threshold Pair	Target Pairs	Acres	Threshold Pairs	Target Pairs	
Tieton RW153	10 sites +4 site[1] WILDERNESS	6+ Pr	25587	9.6	6.4	32747	12.3	8.2	29616	11.1	7.4	17%
Lost Lake DM12	1 site	1 Pr	3588	1.4	NA	5112	1.9	NA	1956	0.7	NA	11%

(4) Tieton LSR, Lost Lake MLSA, and Russel Ridge MLSA

These LSR/MLSAs are part of the reserves that are predicted to provide the needs for spotted owl recovery over time (50+ years). Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. The reserves function for connectivity and spotted owl home ranges. With the exception of a few LSR/MLSAs that are not sustainable, it is concluded that the LSR/MLSA reserves on the Wenatchee National Forest meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing. (See Appendix 1, "Forest-wide Spotted Owl Module" and "Individual LSR/MLSA Spotted Owl Module")

b) Spotted Owl Home Ranges

Within the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA, there are 13 spotted owl activity centers, an additional 4 sites are outside, immediately adjacent to the Tieton LSR. The estimated amount of habitat within a 1.8 mile radius of the 13 activity centers is shown in Table VIII-24, Suitable Spotted Owl Habitat, Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA (1996 S. Owl Activity Centers, App 12a). There are 2 owls below threshold acreage, they are both in the Russell Ridge MLSA SO831 and SO864. There are 6 owls at Threshold acreage, the Lost Lake MLSA owl SO807, and 5 owls in the Tieton LSR. There are 5 owls at optimal levels, these are all in the Tieton LSR. Over-time it is expected that some owl sites may shift to more contiguous and sustainable habitats, such as SO864 (to the northwest) and SO807 (to the southwest). Spotted owl habitat acreage needs to be validated and site centers monitored. Spotted owl habitat acreage should be re-evaluated, especially for owls: SO831, SO864, SO802, SO828, SO834, SO841, and SO807.

The spotted owls below threshold (SO831 Soup Creek and SO864 West Fall Creek) are of highest priority to improve habitat, accelerate non-suitable habitat towards late successional. The next priority is to protect habitat from risk of fire in the drier sites of Lost Lake and Russell Ridge (SO864, SO831, SO841, SO807, SO812, SO834). The spotted owls below target/optimal acreage (3,994 acres), need to accelerate habitat towards late successional. This should occur in wet/moist forest groups in dispersal habitat and in past harvest units. See Table VIII-24, Suitable Spotted Owl Habitat, Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA (1996 S. Owl Activity Centers, App 12a).

There is some dispersal habitat that can be accelerated towards threshold goals for all owl sites. See Table 6? "Dispersal Habitat for Spotted Owls".

The four spotted owl sites adjacent to the Tieton LSR (SO800, SO819, SO834, SO888) provide genetic interchange and are connected in clusters to interior owls. These adjacent sites should be monitored, it is possible that they may move nest sites into the LSR, over time. The remainder of the LSR/MLSAs should be monitored for additional spotted owl sites, especially in the upper Wildcat/Kitten/Thunder Creeks, Pickle Prairie/Golden Meadows and upper Clear Creek areas.

The three LSR/MLSAs are very low in Forest Interior (contiguous forest blocks). The low amounts of Forest Interior is due in part to naturally fragmented habitat, as well as fragmentation near roads. The Tieton LSR, especially, should support more contiguous habitat. There is great potential to restore sustainable habitat in the wetter forest groups for long-term population viability in the Tieton LSR. There is also a need to protect existing habitat and home ranges, especially in sites below threshold and target acreage's. See Restoration Opportunities and site Priority in Table 5? below. Overtime, it is expected that higher quality and more sustainable habitat will be restored to LSR/MLSAs. The drier forests within the LSR/MLSAs will eventually be managed for other late-successional species.

The adjacent forested habitats of the Goat Rocks and William O. Douglas Wilderness areas are important for the functioning of connectivity. Connectivity potential is in Conrad Creek, upper North Fork Tieton, Miriam to Hell Creeks of GRW. Connectivity is also in upper Clear Creek, Indian Creek, Rattlesnake Meadows, Wildcat to Thunder in the WODW.

Table VIII-24, Suitable Spotted Owl Habitat, Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA (1996 S. Owl Activity Centers, App 12a)

	SUITABLE SPOTTED OWL HABITAT[10]												Restore
LSR & MLSA	1.8 mile Circle Around Activity Center						0.7 mile Circle Around Activity Center						Opps & Priority
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total	* & #
TIETON													
SO800[1] **Round Hell**	0	0	1,785	582	971	3,337	0	0	557	45	43	646	**m**
SO802 Tieton/Cedar	680	0	2,956	288	180	**4,105**	145	0	590	0	0	**735**	**m,p #9**
SO809 Spruce Cr	443	0	3,661	228	568	**4,900**	27	0	748	0	92	**867**	**m,p #14**
SO812 Sleepy park	1,226	0	1,711	661	0	**3,598**	182	0	446	0	0	**629**	**m,a,p #8**
SO819[1] Scatter Cr	0	0	357	81	2,788	3,226	0	0	7	0	651	658	**m**
SO828 Indian Cr	689	0	1,910	162	476	**3,237**	108	0	463	0	21	**592**	**m,a,p #5**
SO834[1] **Tieton Rv**	772	0	2,456	112	10	3,350	66	0	452	0	0	519	**m,p #10**
SO835 Sand Rdg	49	0	2,409	125	387	**2,970**	0	0	494	0	35	**530**	**m,a,p #4**
SO837	23	0	2,607	109	2,091	**4,831**	0	0	573	55	180	**808**	**m,p**

LSR & MLSA	SUITABLE SPOTTED OWL HABITAT[10]												Restore Opps & Priority
	1.8 mile Circle Around Activity Center						0.7 mile Circle Around Activity Center						
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total	* & #
TIETON													
SO800[1] Round Hell	0	0	1,785	582	971	3,337	0	0	557	45	43	646	m
SO802 Tieton/Cedar	680	0	2,956	288	180	**4,105**	145	0	590	0	0	**735**	m,p #9
Corral Cr													#13
SO841 SF Tieton CG	1,522	0	1,551	0	0	**3,072**	428	0	103	0	0	**531**	m,a,p #7
SO855 Bear Cr	12	0	1,769	424	2,844	**5,049**	7	0	256	21	517	**801**	m,p #15
SO870 Grey Cr	336	0	2,708	102	1,028	**4,174**	0	0	509	51	130	**690**	m,p #12
SO882 Clear Lake	12	0	1,745	38	1,091	**2,886**	0	0	406	0	132	**538**	m,a,p #3
SO888[1] Miriam Cr	0	0	1,418	455	1,825	3,698	0	0	278	109	269	656	m,a,p #11
LOST LK													
SO807 Jump Off Mdws	1,188	0	1,412	321	0	**2,920**	122	0	364	56	0	**542**	m,a,p #6
RUSSELL													
SO831 Soup Cr	922	0	1,076	448	471	**2,917**	132	0	260	0	0	**393**	m,a,p #1
SO864 W.Fall Rock	1,198	0	814	1	425	**2,438**	277	0	89	0	5	**371**	m,a,p #2
Historic Owl													
Unk													

[1] **Owl Site adjacent to LSR/MLSA.** Less than 1400' from Boundary.

Below Threshold: < 2,663 ac suitable spotted owl habitat in 1.8 mi circle **OR** < 500 ac suitable spotted owl habitat in 0.7 mi circle.

At Threshold: 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

Optimum/Target: > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

[10] **Suitable spotted owl habitat** includes **Dry** vegetation code 12 where size/structure is multistory greater than 9" DBH;

mesic includes code 22; and

wetter includes:

Moist codes 32, 36; **Wet** codes 62, 64; and **SAF** code 42.

*** Restoration Opportunities: M** = Monitor Habitat & Site; **P** = Protect Habitat From Risk; **A** = Accelerate Habitat Towards Nesting, roosting, Foraging; **C** = Coordinate Habitat and Site Management, or Acquire Habitat.

Table VIII-25, Dispersal Habitat for Spotted Owls in Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA (1996 S. Owl Activity Centers, App 12a)

LSR & MLSA	Pair Status	Dispersal Habitat			
		Dry	Mesic	Wet	
Spotted Owl		Acres	Acres	Acres	Total
Tieton					
SO800[1]	PY	37	0	1,158	**1,195**
SO802	PY	242	0	140	**382**
SO809	PY	59	0	118	**177**
SO812	PY	109	0	75	**183**
SO819[1]	PY	0	0	1,751	**1,751**
SO828	PY	224	0	345	**569**
SO834[1]	PY	764	0	77	**841**
SO835	PY	158	0	841	**1,000**
SO837	PY	44	0	27	**71**
SO841	P	447	0	57	**504**
SO855	PY	72	0	9	**81**
SO870	PY	55	0	329	**384**
SO882	PY	70	0	293	**363**
SO888[1]	PY	0	0	1,451	**1,451**
Lost Lake					
SO807	PY	115	0	430	**545**
Russell Ridge					
SO831	PY	460	0	183	**643**
SO864	PY	339	0	0	**339**
Historic Owl					

[1] **Owl Site adjacent to LSR/MLSA.** Less than 1400' from Boundary.

Dispersal Habitat within 1.8 mile circle around activity center. **Dry** dispersal habitat includes vegetation codes 11, 13, and 52; **mesic** dispersal includes code 21; and **wet** dispersal includes codes 31, 35, 61, and 41.

c) Spotted Owl Dispersal And Connectivity

Currently, the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA provides habitat for 13 pairs of owls, with an additional 4 pairs adjacent to the Tieton LSR. The LSR/MLSAs can sustain 10+ pairs of owls over time, and provide genetic exchange within the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA and between other LSRs and MLSAs. Important connectivity corridors and patches between home ranges are Corral Creek to North Fork Tieton, Pickle Prairie to Sleepy Park Meadows,

Andy/Indian/Wildcat Creeks, Wildcat to Soup Creeks, Wildcat/Thunder Creeks, and Bear Creek to Cold Creek. The Spruce Creek SO809 and Grey Creek SO870 owl habitats provide important connectivity between three clusters.

Important connectivity between LSRs/MLSAs include:

- Golden Meadow and Sleepy Park Meadow;
- Tieton Basin and Soup Creek;
- Andy Creek to Russell Creek or between Indian Creek and Wildcat Creek;
- Indian Creek and Mosquito Valley.
- Wildcat, Little Wildcat, Rattlesnake Meadows, headwaters Rattlesnake to Copper Creek.
- Wildcat Creek to Little Wildcat to Rattlesnake Meadows to Elkhorn to headwaters Little Rattlesnake.
- Indian Creek or Wildcat Creek to Rattlesnake Meadows, Rattlesnake to Buck Lake/North Fork Rattlesnake to Schneider Springs and Glass Creek.
- Soup Creek and headwaters Little Rattlesnake Creek.
- Tieton LSR to Clear Fork Cowlitz LSR (Gifford Pinchot NF) via habitat in Clear Creek and Cortright Creek.
- Tieton LSR/Lost Lake MLSA to the Yakama Tribal Lands via habitat between Narrow Neck Gap and Divide Ridge. Also between Louie Way Gap and Divide Ridge.

The adjoining Wilderness Area habitat is extremely important for all of these LSR/MLSA connections. Some matrix lands are important for connectivity between LSR/MLSAs. These connectivity corridors and patches should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc.

During dispersal, nesting, roosting, foraging habitat is used, as well as habitat of lower quality (dispersal habitat). Dispersal habitat includes single story stands, and smaller trees with at least 40% crown closure. Dispersal habitat within the Tieton LSR is 9%, Lost Lake MLSA is 20%, and Russell Ridge MLSA is 22%. Dispersal habitat will grow up to be nesting/roosting/foraging for spotted owls. Habitat providing dispersal/connectivity corridors and patches within the LSR/MLSAs are scattered about (see Forest Interior map and Suitable Spotted Owl Habitat Map).

The function of dispersal/connectivity habitat for spotted owls depends on the amount and juxtaposition of late-successional, forest interior, and dispersal habitat. Late successional habitat is fairly abundant in the Tieton LSR, yet is highly fragmented, 60% of the LSR is in wetter forest late-successional habitat and 17% of the LSR is in Forest Interior. The Lost Lake MLSA and Russell Ridge MLSA both have low amounts of wetter late successional forest (approximately 30% of the MLSAs combined) and they are both low in Forest Interior habitat at 10% of the MLSAs combined. Fragmentation of forest interior is a result of natural rocky soils/landscapes and created openings in wet forest groups; and partial cutting in the drier types. The forest interior dry habitat may currently provide good connectivity for spotted owls, but over time is not sustainable. The high road densities (2.8 to 3.9 miles per square mile) and really low security habitat (16-26%) effects connectivity, in that fragmentation usually occurs along roads, and snag reductions for road maintenance cumulatively effects habitat overtime.

Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSR's in Matrix and in AMA's, and in wilderness areas (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).

d) Restoration Opportunities And Potential Projects Within LSR/MLSA for Spotted Owls

- **Monitor Effectiveness**

1. Meet goals of the Tieton LSR of 6+ pairs, Lost Lake MLSA of 1 pair, and Russell Ridge MLSA of 2 pairs of spotted owls. Monitor Activity Centers, Core Areas and Home Ranges.
2. Verify habitat acreage on site centers and habitat acreage of special concern owls: SO831, SO864, SO802, SO828, SO834, SO841, and SO807. -.
3. Monitor LSR/MLSA function in clusters (reproductive status and demography). Monitor the four main cluster groups: the South Fork Tieton area (5 owl pairs);. Clear Lake area (3 owl pairs, plus 3 adjacent pairs); Lost Lake to Short-and-Dirty Creek areas (this cluster has 3 pairs, plus one adjacent pair); and the Russell/Wildcat/Soup Creek areas (2 pairs).
4. Monitor important connectivity owl sites: Spruce Creek SO809 and Grey Creek SO870 connect between 3 clusters
5. Monitor 4 owl pairs, adjacent to Tieton LSR (SO800, SO819, SO834, SO888). Do they provide genetic interchange? Will they select new nest sites within the LSR?
6. The remainder of the LSR/MLSAs should be monitored for additional spotted owl sites, especially in the upper Wildcat/Kitten/Thunder Creeks, Pickle Prairie/Golden Meadows and upper Clear Creek areas.
7. Monitor important connectivity between home ranges: Corral Creek to North Fork Tieton; Pickle Prairie to Sleepy Park Meadows; Andy/Indian/Wildcat Creeks; Wildcat to Soup Creeks; Wildcat/Thunder Creeks; and Bear Creek to Cold Creek.
8. Monitor important connectivity between LSRs/MLSAs for effectiveness, especially Rattlesnake Meadows areas, Wildcat Creek, Narrow Neck Gap, and upper Clear Creek.
9. Monitor sites that have not been located and/or had surveys conducted in the past 5 years. Monitor historical owl sites.

- **Monitor Validity**

10. Validate monitor the vegetation mapping.
11. Spotted owl habitat acreage needs to be validated, especially the amount of subalpine fir habitat.
12. Validate monitor the spotted owl habitat model, and owl acreage prior to project implementation.
13. Field verify habitat and activity center locations.
14. Validate assumption that over-time some owl sites may move to more contiguous and sustainable habitats: SO864 (northwest) and SO807 (southwest).
15. Validate the long-term the assumption that the LSR/MLSAs can sustainable habitat (moist forest groups) can support Tieton LSR 7.4 pairs of owls, Lost Lake MLSA 0.7 pairs of owls, and Russell Ridge MLSA 2 pairs of owls. The adjacent wilderness habitat is important to continue this linkage for spotted owls.

- **Monitor Implementation**

16. Consider reconfigure spotted owl habitat home range, based on foraging pattern, rather than 1.8 mile circle, especially Russell Ridge SO864, SO831; Lost Lake SO807; Tieton SO841, SO834, SO819, SO800, SO835 and SO828.
17. During management proposals, use habitat quality/risk assessment analysis (Appendix 29) to help display best quality habitats and stands of highest risk to loss.

- **Protection**

18. There is also a need to protect existing habitat and home ranges, especially in sites below threshold and target acreage's, Russell Ridge MLSA owls SO864 and SO831.
19. Protect habitat from risk of fire in the drier sites of Lost Lake and Russell Ridge (SO864, SO831, SO841, SO807, SO812, SO834).
20. Some suitable owl habitat and owl sites may be vulnerable to the risk of fire in dry forest types, and may need some fire risk protection, on habitat outside of LSR.

    Fuels reduction and hazard reduction occur outside N/R/F habitat in short term, shift emphasis after 50 years. Accept more risk from fire, manage at high end of spotted owl habitat DC in wet sites. 500 Acre core area protected, 100 acre activity center protected.
21. Buffer around late-successional habitat from dry forest encroachment.

- **Maintain**

22. Maintain the most contiguous and sustainable suitable spotted owl habitat in:
    - Russell Ridge MLSA is in Wildcat/Kitten/Thunder Creeks area.
    - Lost Lake MLSA is in the Pickle Prairie to Golden Meadows area.
    - Tieton LSR is from Corral Creek to North Fork Tieton, from Phantom Lake to Spruce Creek, Miriam Creek, North Fork Clear Creek, Sand Ridge/Indian Creek.
23. The adjacent forested habitats of the Goat Rocks and William O. Douglas Wilderness areas are important for the functioning of connectivity. Connectivity potential is in Conrad Creek, upper North Fork Tieton, Miriam to Hell Creeks of GRW. And upper Clear Creek, Indian Creek, Rattlesnake Meadows, Wildcat to Thunder I the WODW.

- **Habitat Improvement**

24. See Table 5? "Suitable Spotted Owl Habitat" for prioritization and restoration opportunities. Prioritized sites are: #1 SO831 accelerate habitat and protect; , #2 SO864 accelerate habitat and protect; #3 SO882 accelerate habitat and protect; #4 SO835 accelerate habitat and protect; #5 SO828 accelerate habitat and protect; #6 SO807 accelerate habitat and protect. See list for additional.
25. The spotted owls below threshold (SO831 and SO864) are of highest priority to improve habitat, accelerate non-suitable habitat towards late successional.
26. The spotted owls below target/optimal acreage (3,994 acres), need to accelerate habitat towards late successional. This should occur in wet/moist forest groups in dispersal habitat and in past harvest units. SO812, SO828, SO835, SO841, SO882.
27. There is some dispersal habitat that can be accelerated towards threshold goals for all owl sites.

28. These three LSR/MLSAs are very low in Forest Interior, due to their fragmentation near roads. The Tieton LSR, especially, should support more contiguous habitat. There is great potential to restore sustainable habitat in the wetter forest groups for long-term population viability (the Tieton LSR is highest priority).
29. Dispersal habitat in the past harvest areas should be accelerated towards foraging/roosting/nesting habitat.
30. Potential habitat includes 5,000 acres, that are currently in created opening or sapling/pole which will grow into suitable spotted owl habitat in the next 50 to 120 years. These acreage's should be accelerated towards late successional habitat.
31. Improve and accelerate N/R/F habitat in wet forest groups, to maintain number of spotted owl pairs. Accelerate dispersal habitat and old plantations:
    - Clear cuts in wet/moist vegetation groups predicted to be habitat in 100 years.
    - Pole sized stands in wet/moist will be habitat in 50 years.
    - Clearcuts in mesic/dry vegetation groups will be habitat in 120 years.
    - Pole sized stands in mesic/dry will be habitat in 70 years.
32. Increase habitat effectiveness and connectivity by reducing open road density and revegetating road beds, especially in Forest Interior patches.

- **Coordinate**

33. Coordination with adjacent Yakama Tribal lands, DNR lands and private land owners for connectivity to the south of the LSR/MLSAs.

6. Aquatic

a) Tieton LSR and Lost Lake MLSA

The Tieton LSR and Lost Lake MLSA are located within the Tieton Watershed. The Tieton River is a tributary to the Naches River, flowing into the Naches near the town of Naches. The Naches River is a major tributary to the Yakima River. Human development, especially for irrigation, but also recreation, timber harvest and grazing has impacted riparian habitat, aquatic habitat and the native fish community in the Tieton watershed. Important fish populations and habitat remain though and need to be considered in any management for late successional habitat objectives.

(1) Geomorphology

The Lost Lake MLSA and the Tieton LSR are located in two different subsections. The Lost Lake MLSA is located in the Cascade Mountains, Non-Glaciated subsection. The Tieton LSR lies within the Naches Mountains subsection. The Cascade Mountains, Non -Glaciated subsection is dominated by basalt flows, while in the Naches Mountains the geomorphology has been shaped by volcanic activity in the form of basalt flows and pyroclastic activity, and alpine glaciation.

(a) Cascade Mountains, Non-Glaciated

The Lost Lake MLSA is located within the Cascade Mountains, Non-Glaciated. Two landtypes predominate within the MLSA, Mountain Slope Landtype and Structurally Controlled Mountain Slope landform. Both landtype are dominated by basalt flows, the primary difference being in the Structurally Controlled Mountain Slopes the basalt flows are interbedded with older pyroclastic

material. The dominant land forming processes are fluvial downcutting through basalt and mass wasting.

The Mountain Slope landform is characterized by high soil moisture stress, poor stream flow regulation and a low stream density. The low stream density and soil moisture stress results from a naturally dry landscape, poor soil development and high percolation rate in the basalt. Runoff rapidly seeps deeply into the bedrock. Many streams are intermittent or will be interrupted during low flow periods. The landform is fairly resistant to disturbance due to the near surface bedrock, poor soil, and little near surface ground water.

Within the Structurally Controlled Mountain Slope Landforms the basalt flows are interbedded with older pyroclastic material. The pyroclastics have weathered into fine textured material. The fine textured pyroclastics can become saturated overtime and create large deep seated landslides. Where water becomes saturated localized smaller landslides may occur. Soil moisture stress is not as much a problem in this landform but fine sediment may be generated by the fine textured pyroclastic material. The water holding capacity of the pyroclastics helps regulate stream flows.

(b) Naches Mountains Subsection

The Naches Mountain Subsection is a mixture of basalt, sedimentary bedrock and pyroclastic material shaped by alpine glaciation. Within the Tieton LSR landforms include: Structurally Controlled Mountain Slope Landforms-Sedimentary Bedrock, Low Relief Glacial Landform, Glaciated Mountain Slopes, Glacial Cirques and Glacial Troughs. Several geomorphic processes have been functioning. These include alpine glaciation, mass wasting, fluvial downcutting, and volcanism. Alpine glacial processes have eroded the upper drainages along the Cascade Crest. Mass wasting occurs throughout the subsection but especially along the contact zone with the basalt plateaus on the eastern boundary.

The physical characteristics of the Naches Mountains differ from the Wenatchee Highlands subsection which was also glaciated. In the Wenatchee Mountains alpine glaciers carved through competent crystalline bedrock primarily granitics, resulting in steep valley walls and broad U-shaped valleys. The till material was deposited on the valley walls. When the till material becomes saturated on the steep slopes debris flows often occur. When the glaciers moved through the Naches Mountains however instead of granitics the glaciers encountered soft sedimentary rock and pyroclastic material. The sedimentary and pyroclastic rock weathers rapidly into fine-grained material which has subsequently collapsed, creating a rounded relief. The Naches Mountains are relatively well regulated hydrologically as the fine textured material is able to capture runoff in shallow aquifers. Stream temperatures, especially in small tributaries and headwaters should be relatively cold. The fine textured material is susceptible to erosion and will produce fine sediment. Due to the relatively rounded relief, debris flows are not a major delivery mechanism for wood and sediment into streams. Localized landslides do occur though when water becomes concentrated in the fine textured parent material.

Where basalt is the dominant parent material the streams will be poorly regulated and fine sediment generally is not a concern unless the basalt is bedded within pyroclastic or sedimentary rock.

(c) Management Concerns Due to Geomorphology - Cascade Mountains, Non-Glaciated (Lost Lake MLSA)

The basalt landforms (Mountain Slope, Volcanic Bedrock) are fairly resistant to management. Due to the coarse material fine sediment delivery to streams is generally not a concern, the landform is not subject to debris flows or landslides and stream banks are well armored. Soil moisture stress makes maintenance of organic ground cover important. Low stream flows make maintenance of stream

shading important. Riparian areas associated with perennial streams, seeps and springs are probably especially important to riparian dependent wildlife in the dry landscape.

Where the basalt is interbedded with pyroclastic material along the flow margins (Structurally Controlled Mountain Slopes, Volcanic/Pyroclastic Landform) deep seated landslides may occur. Concentration of water may also trigger localized landslides. The fine textured pyroclastic material will make native surface roads soft, subject to rutting and erosion. Where roads concentrate water landslides may occur. Fine sediment delivery to streams is thus a management concern. Due to the high maintenance needed for native surface roads, potential for fine sediment and landslides, roads need to be well designed and located.

Most large wood and other organic material probably enters streams from the riparian area due to blow down or bank erosion. Maintenance of riparian trees and shrubs is therefore important for future large wood delivery to streams, protecting banks from accelerated bank erosion, and filtering fine sediment, as well as shading the aquatic and riparian environment.

(d) Management Concerns Due to Geomorphology - Naches Mountains (Tieton LSR)

Soft sedimentary and pyroclastic bedrock rapidly weathers to clay. The fine textured soil is susceptible to erosion especially when wet. Fine sediment delivery to streams is a concern. The fine textured materials absorb moisture in shallow aquifers thus springs are common and stream flows are somewhat regulated. Where water becomes concentrated localized landslides may occur. Road construction and location are important. Native surface roads will become soft when wet, causing high maintenance needs and potential fine sediment production. Roads should be designed and located to avoid cutting into shallow aquifers and concentrating water, both to protect the road surface and prevent road related landslides.

Except when associated with a landslide organic material enters streams from the adjacent riparian area. Riparian vegetation is important to anchor easily erodible banks, provide large wood input to streams, filter fine sediment and to shade the aquatic and riparian environment.

(2) Tieton Watershed

The Tieton LSR and Lost Lake MLSA are located within the Tieton Watershed. The Tieton River is a tributary to the Naches River, flowing into the Naches near the town of Naches. The Naches River is a major tributary to the Yakima River. The Naches River is an important anadromous fish tributary to the Yakima. Historically the Tieton River drainage supported spring chinook salmon, summer steelhead, coho salmon summer steelhead, bull trout, westslope cutthroat trout and redband trout. Anadromous fish and access to most anadromous fish habitat has been eliminated in the Tieton. Coho have been virtually eliminated from the Yakima subbasin. Rimrock reservoir is a Bureau of Reclamation project supplying irrigation water to the Yakima valley. The dam is a total barrier to anadromous fish, migratory bull trout as well as native westslope cutthroat and redband trout. Fish populations above the dam are effectively isolated from the rest of the Naches system. Stocking of non-native trout and salmon has further impacted the native fish community. Introduced kokanee salmon (land-locked sockeye salmon) are now a popular sport fish in Rimrock Lake. Brook trout and non-native rainbow have been stocked through much of the system. Rainbow continue to be stocked in Clear and Rimrock Lakes. Rimrock Lake and Clear Lakes are very popular for recreation and fishing for the introduced species one of the popular recreation activities.

Anadromous fish (and resident trout) habitat and populations are also impacted by an altered flow regime below the reservoir designed to protect spring chinook spawning in the upper Yakima while providing irrigation water to the Yakima Valley. The resulting Tieton River flows have been flip-

flopped from the natural regime. During spring run-off water is withheld in Rimrock Lake while most irrigation flows are released from upper Yakima River reservoirs. In late summer flow are stored in the upper Yakima and released from Rimrock. This "flip-flop" helps protect spring chinook salmon in the upper Yakima River but creates poor fish habitat conditions in the Tieton. The Tieton below the dam has further been impacted by Hwy 12 which constrains the floodplain. The Tieton is now a popular rafting stream during the late summer high flow period.

(a) Tieton River Below Rimrock - Lost Lake MLSA

The Lost Lake MLSA includes lands below Rimrock Dam in the Lower Tieton and Middle Tieton subwatersheds. Spring chinook salmon, summer steelhead and bull trout historically migrated up through this portion of the Tieton. The fish probably also spawned and reared within these two subwatersheds. Some chinook salmon, steelhead and bull trout are still found in the lower Tieton but this portion of the watershed supports few of these fish. Both spawning and rearing are impacted by the altered flow regime. The flow regime has undoubtedly altered channel characteristics from the historic condition and thus habitat. The lower Tieton River is now considered an incidental producer of spring chinook, summer steelhead and bull trout.

Westslope cutthroat and redband/rainbow still inhabit the lower Tieton. Most of the populations in the mainstem and tributary streams below the dam are likely redband/rainbow hybrids or rainbow/westslope cutthroat hybrids. Rainbow trout are still planted in the lower river for sport fishing.

A number of amphibian species have been documented in this portion of the watershed. Riparian habitat associated not only with perennial streams but also the small lakes and ponds. Known amphibian species include Cascades frog, Pacific long-toed salamander, rough skinned newt, spotted frog, tailed frog, Pacific tree frog and western toad.

(b) Lower Tieton River Late Successional Habitat Management Concerns

The native fish community has been altered by man's activities. Bull trout, spring chinook salmon and summer steelhead may still exist below Rimrock dam but not in great numbers. Rimrock dam has blocked migratory fish access into much of the Tieton watershed. Water management decisions for irrigation and anadromous fish concerns elsewhere in the Yakima basin have resulted in an unnatural flow regime within the lower Tieton. These decisions have precluded major fish population restoration below Tieton dam. Planting of resident trout combined with associated fishing pressure has reduced or replaced most native trout populations. Management needs to be concerned with maintaining riparian habitat, especially in tributary streams and lakes, for shade to the aquatic system and riparian microclimate, maintain bank stability and filter sediment and avoid detrimental downstream impacts to the Naches River. The primarily basalt landforms are fairly resistant to adverse impacts to watershed processes due to management activities and where the basalt is interbedded with fine material fine sediment and landslides are a concern. Overall though, given the relatively low aquatic resource values and the amount of at risk late successional habitat, the Tieton watershed downstream of Rimrock dam may present opportunities for aggressive vegetation to meet late successional habitat objectives with a low risk of short term impacts to aquatic resources. The condition of aquatic resources may also make short term risk of adverse effects to aquatic resources acceptable in order to meet long term ecosystem objectives.

(c) Tieton River Above Rimrock - Tieton LSR

The Tieton LSR is located within the Fish-Spencer-Short and Dirty, Lower South Fork Tieton, a small amount of the Headwaters South Fork Tieton, the Lower North Fork Tieton, Clear, Indian and

Rimrock Lake subwatersheds. Rimrock dam has eliminated anadromous fish to most of the watershed and isolated the bull trout population. The natural aquatic ecosystem has been changed with the formation of Rimrock Lake and Clear Lake. With the lakes has come heavy recreation use and development. Non-native rainbow and brook trout are common above the dam and non-native kokanee salmon were planted in Rimrock Lake providing a popular sport fishery. The kokanee fishery is now maintained by natural recruitment with most of the spawning located in the portion of the North Fork Tieton below Clear Lake and a fair number of fish spawning in Indian Creek.

Significant fish populations still exist within the upper Tieton watershed. Conservation of these populations may be challenging given isolation caused by the dam and introduction of non-native aquatic species. Maintenance of the native populations may be important though to Columbia basin wide species conservation efforts.

Indian Creek subwatershed and the Lower South Fork Tieton subwatershed support significant bull trout populations. Adult bull trout migrate from Rimrock Lake (where they probably forage on introduced kokanee and stocked rainbow) into the South Fork Tieton and Indian Creek for spawning. The two streams are the only ones known to be used for bull trout spawning and provide most of the rearing habitat. It appears that the Indian Creek and South Fork Tieton bull trout populations may be two fairly distinct populations with little genetic exchange (Paul James, Central Washington University personnel communication). Other tributaries which may have once provided substantial spawning and rearing habitat are Clear Creek and the North Fork Tieton. These streams have been isolated though by Clear Lake Dam. Passage has been provided around the dam but little bull trout use has been observed in Clear Lake or its tributaries. One juvenile bull trout was observed in the North Fork in 1996. Introduced brook trout have become established in Clear lake and its tributaries which may make re-introduction of bull trout difficult.

A long history of stocking non-native rainbow may have eliminated native redband and reduced the westslope cutthroat population. Westslope cutthroat are found in Short and Dirty Creek and in the upper South Fork Tieton above a falls near Discovery Creek. These populations may not have been greatly influenced by stocking non-native rainbow and would be significant if they represent pure genotypes of the species. Juvenile bull trout have also been observed rearing in Short-and-Dirty Creek. Westslope cutthroat trout are also found in Indian Creek. Redband/rainbow trout are not known to exist in the stream. If the cutthroat population has not been greatly influenced by past stocking of rainbow trout in Rimrock Lake or elsewhere in the watershed, the Indian creek westslope may be a significant population.

A number of amphibian species have been document in the Tieton watershed above the dam including, Cascade frogs, long-toed salamanders, northwestern salamanders, rough-skinned newt, spotted frog, tailed frog, Pacific tree frog and western toad.

(3) Upper Tieton Late Successional Management Concerns

Fish populations in the Tieton watershed above Rimrock Dam are isolated from the rest of the Tieton and Naches River system. If native populations become extinct in any stream refounding populations must therefore must come from other populations above the dam. In a sense it is a closed system. The introduction of exotic trout has reduced the number of streams supporting native populations so where native populations exist they are especially significant. Management activities should be conservative towards the significant watersheds so that the result of management does not induce stress on the remaining significant populations or create conditions which may give non-native species a competitive advantage. Watershed restoration should be used to improve watershed and aquatic habitat conditions in the significant watersheds. Where possible restoration efforts should include reintroduction or expanding the range of the native populations. The extent of non-native

populations may make re-introduction of native fish into streams very difficult. The introduced kokanee population may also be a management concern due to the recreational value. Because it is unlikely late successional habitat management activities which follow the Aquatic Conservation Strategy will adversely impact the lake habitat, the kokanee population may not be a late successional habitat management concern.

The Lower South Fork Tieton and Indian Creek are of special concern because they provide the bulk of the spawning and rearing habitat for bull trout. The Headwaters South Fork Tieton also needs special consideration not only because it is tributary to the Lower South Fork. The Headwaters South Fork Tieton may support a significant redband trout population The Short-and-Dirty subwatershed may also support a significant westslope cutthroat population and is utilized to some extent by South Fork Tieton bull trout. In addition to bull trout Indian Creek may be significant for westslope cutthroat.

Russell Ridge MLSA

The Russell Ridge MLSA is located within the Tieton Watershed. The Tieton River is a tributary to the Naches River, flowing into the Naches near the town of Naches. The Naches River is a major tributary to the Yakima River. Human development, especially for irrigation, but also recreation, timber harvest and grazing has impacted riparian habitat, aquatic habitat and the native fish community in the Tieton watershed. Important fish populations and habitat remain though and need to be considered in any management for late successional habitat objectives.

(4) Geomorphology

The Russell Ridge MLSA is located within the Cascade Mountains, Non Glaciated subsection. Two landtypes predominate within the MLSA, Mountain Slope Landform and Structurally Controlled Mountain Slope landform. Both landtypes are dominated by basalt flows, the primary difference being in the Structurally Controlled Mountain Slopes the basalt flows are interbedded with older pyroclastic material. The primary landform processes are fluvial downcutting through basalt and mass wasting.

The Mountain Slope landform is characterized by high soil moisture stress, poor stream flow regulation and a low stream density. The low stream density and soil moisture stress results from a naturally dry landscape, poor soil development and high percolation rate in the basalt. Runoff rapidly seeps deeply into the bedrock. Many streams are intermittent or will be interrupted during low flow periods. The landform is fairly resistant to disturbance due to the near surface bedrock poor soil and little near surface ground water.

Within the Structurally Controlled Mountain Slope Landforms the basalt flows are interbedded with older pyroclastic material. The pyroclastics have weathered into fine textured material. The fine textured pyroclastics can become saturated overtime and create large deep seated landslides. Where water becomes saturated localized smaller landslides may occur. Soil moisture stress is not as much a problem in this landform but fine sediment may be generated by the fine textured pyroclastic material. The water holding capacity of the pyroclastics helps regulate stream flows.

(a) Management Concerns Due to Geomorphology

The basalt landforms (Mountain Slope, Volcanic Bedrock) are fairly resistant to management. Due to the coarse material fine sediment delivery to streams is generally not a concern, the landform is not subject to debris flows or landslides and stream banks are well armored. Soil moisture stress makes maintenance of organic ground cover important. Low stream flows make maintenance of stream

shading important. Riparian areas associated with perennial streams, seeps and springs are probably especially important to riparian dependent wildlife in the dry landscape.

Where the basalt is interbedded with pyroclastic material along the flow margins (Structurally Controlled Mountain Slopes, Volcanic/Pyroclastic Landform) deep seated landslides may occur. Concentration of water may also trigger localized landslides. The fine textured pyroclastic material will make native surface roads soft, subject to rutting and erosion. Where roads concentrate water landslides may occur. Fine sediment delivery to streams is thus a management concern. Due to the high maintenance needed for native surface roads, potential for fine sediment and landslides roads need to be well designed and located.

Most large wood and other organic material probably enters streams from the riparian area due to blow down or bank erosion. Maintenance of riparian trees and shrubs is therefore important for future large wood delivery to streams, protecting banks from accelerated bank erosion, and filtering fine sediment as well as shading the aquatic and riparian environment.

(5) Tieton Watershed

The Russell Ridge MLSA is located within the Tieton Watershed. The Tieton River is a tributary to the Naches River, flowing into the Naches near the town of Naches. See Tieton LSR aquatic discussion.

(a) Russell Ridge Aquatic Resources

The Russell Ridge MLSA is located within portions of the Middle Tieton, Wildcat and Rimrock Lake subwatersheds. The portion of the MLSA within the Rimrock subwatershed drain through small first and second order streams directly into Rimrock Lake. Wildcat Creek enters the Tieton River just downstream of Rimrock Dam. The Middle Tieton subwatershed is located entirely below the dam. Spring chinook salmon, summer steelhead and bull trout historically migrated up through the Tieton into the portion of the watershed upstream of Rimrock Dam. The fish probably also spawned and reared within the main Tieton. Chinook salmon, steelhead and bull trout are still found in the lower Tieton but this portion of the watershed supports few of these fish. Both spawning and rearing are impacted by the altered flow regime. The flow regime has undoubtedly altered channel characteristics from the historic condition and thus habitat. The lower Tieton is now considered an incidental producer of spring chinook, summer steelhead and bull trout.

Westslope cutthroat and redband/rainbow still inhabit the lower Tieton. Most of the populations in the mainstem and tributary streams below the dam are likely redband/rainbow hybrids or rainbow/westslope cutthroat hybrids. Rainbow trout are still planted in the lower river for sport fishing.

Both westslope cutthroat and redband/rainbow trout are found in Wildcat Creek subwatershed. It is also believed that summer steelhead are present due to there being no migration barriers and the redband/rainbow population. The genetic composition of the redband/rainbow and the westslope cutthroat trout population are not known. The subwatershed is considered significant though for westslope cutthroat due to an apparent healthy population. Spring chinook salmon are considered to be absent from Wildcat and it is not known if bull trout exist within the Wildcat subwatershed.

Bull trout, redband/rainbow, introduced brook trout and introduced kokanee salmon (land-locked sockeye salmon) are found in Rimrock Lake. The lake is considered significant for bull trout. Juvenile bull trout migrate from the South Fork Tieton and Indian Creek into Rimrock Lake. There the fish mature before ascending the two streams for spawning. Rainbow trout have been and continue to be stocked in the reservoir. Kokanee salmon were stocked but are currently reproducing

and maintaining their own population. Rimrock Lake is a very heavily used recreation area fishing is one of the popular recreation activities. It is not known if westslope cutthroat trout are in the Rimrock subwatershed. With the stocking of rainbow and heavy fishing pressure the native trout populations have likely been replaced unless remnant populations exist in some of the smaller tributaries.

A number of amphibian species have been documented within the subwatersheds included within the MLSA. Amphibian species include, Cascades frog, Pacific long-toed salamander, rough skinned newt, spotted frog, tailed frog, Pacific tree frog and western toad.

(b) Late Successional Habitat Management Concerns

The native fish community has been altered by man's activities. Bull trout, spring chinook salmon and summer steelhead may still exist below Rimrock dam but not in great numbers. Rimrock dam has blocked migratory fish access into much of the Tieton watershed. Water management decisions for irrigation and anadromous fish concerns elsewhere in the Yakima basin have resulted in an unnatural flow regime within the lower Tieton. These decisions have precluded major fish population restoration below Tieton dam. Planting of resident trout combined with associated fishing pressure has reduced or replaced most native trout populations.

Management needs to be concerned with maintaining riparian habitat, especially in tributary streams and lakes, for shade to the aquatic system and riparian microclimate, maintain bank stability and filter sediment and avoid detrimental downstream impacts to the Naches River. The primarily basalt landforms are fairly resistant to adverse impacts to watershed processes due to management activities. Where the basalt is interbedded with fine material fine sediment and landslides are a concern. Overall though, given the relatively low aquatic resource values and the amount of at risk late successional habitat, the Tieton watershed downstream of Rimrock dam may present opportunities for aggressive vegetation to meet late successional habitat objectives with a low risk of short term impacts to aquatic resources. The condition of aquatic resources may also make short term risk of adverse effects to aquatic resources acceptable.

The introduced rainbow and kokanee population could be a management concern due to the recreational value, but it is unlikely late successional habitat management activities which follow the Aquatic Conservation Strategy will adversely impact the lake habitat. Management activities will need to account though for avoiding adverse impacts to the bull trout population in the lake. The reservoir may buffer any affects due to prudent management within the watershed draining directly into the lake. The tributary streams should be investigated though for the presence of any native fish populations in the small tributaries.

Wildcat Creek is considered significant for westslope cutthroat however. The population is fairly isolated due to habitat conditions within the Tieton River and introduced rainbow trout. Management should be conservative towards impacting the population due to habitat alteration and creating habitat conditions which may favor introduced rainbow trout.

7. Noxious Weeds

Due to the limited extent of noxious weed occurrence in the Bumping LSR, the following discussion focuses on the Crow MLSA. Containment of existing populations and prevention of further spread is the recommended treatment in the Tieton LSR, Lost Lake and Russell Ridge MLSAs. Twelve noxious weed species were identified to occur within or adjancent to these areas. These species are discussed in priority order as identified by the noxious weed analysis module. There are no Class A weeds presently documented from these areas. Class B-designate weeds include: *Linnaria dalmatica, Centaurea maculosa, Cytisus scoparius, Senecio jacobea, Hypochaeris radicata,* and *Chrysanthemum leucanthemum. Linnaria dalmatica* is becoming

established along Highway 12. This major travelway provides the primary dispersal corridor for this species. Cross-country dispersal is likely also occurring via wildlife and forest visitor movement. The noxious weed analysis (Appendix I) indicates control/eradication efforts for this species should focus on roadways, specifically, Highway 12. *Senecio jacobae* occurs within the Russell Ridge MLSA. Recent past and current hand-pulling of known populations has proven successful in containment/ eradication of this species. *Hypochaeris radicata* is limited in it's occurrence, generally associated with road shoulders at mid to high elevations where moisture is not limiting. A combination of hand pulling and herbicide spraying is recommended for control/eradication of this species. *Chrysanthemum luecanthemum* is known to occur as isolated patches in open forest and along roadways. The largest populations recorded from the Naches Ranger District are documented from the Tieton LSR. Control efforts for this species should focus on activities including hand pulling, herbicides or a combination of these methods. *Cystis scoparius* is found occassionally along Highway 12. Hand pulling of this species has been effective to date.

Centaurea diffusa is the only Class B weed identified in the LSR/ MLSAs and is the second priority for treatment. It occurs primarily along roadways and wasteplaces. Containment and prevention of further spread of this species should focus on major travelways such as Highway 12 and Forest Service roads.

Class C species present include *Hypericum perforatum, Cirsium vulgare,* and *Cirsium canadensis*. *Cirsium vulage* and *C. arvense* are widespread and are documented from areas with recent ground disturbance, primarily areas previously harvested and/or heavily grazed by domestic livestock and wild ungulates. Containment and further spread of these species should focus on heavily used dispersed sites . *Hypericum perfoliatum* is limited in it's occurrence and is found as small isolated populations within the Tieton LSR. *Verbascum thapsus* occurs as isolated patches along roadways and in wasteplaces. *Convolvulus arvense* is known from along Highway 12. It's occurrence is generally infrequent and in small numbers. Hand-pulling and spot herbicide spraying or a combination of these methods should be used for these species. In addition to the above mentioned species, a severe infestation of *Chicorum intybus* is known to occur adjacent to Russell Ridge MLSA. This population is likely to expand and threatens the integrity of the vegetative communities in the adjacent LSR/MLSAs.

8. Fire Management Plan

a) Overview

This plan is intended to provide guidance for the management of fire in the Tieton LSR/Lost Lake MLSA /Russell Ridge MLSA. It will supplement the Fire Management Plan for the Late-Successional Reserve System and will be incorporated into the Fire Management Action Plan for the Wenatchee National Forest.

The disturbance regimes for the vegetation groups have been described in a separate portion of this plan. The intent of this plan is to provide adequate protection of the reserve to allow management practices to be initiated which will provide for the protection of the late-successional associated species and associated unique habitats. These management actions are expected to include actions which will include the role of fire disturbance as an important process in the reserve.

b) Wildfire Prevention Actions

The following actions are site specific for the Tieton LSR/Lost Lake MLSA/Russell Ridge MLSA. They are intended to supplement the actions outlined in the Fire Prevention Plan, which is intended to be implemented on a Forest-wide basis.

1. Initiate campfire restrictions as warranted during periods of high fire danger.
2. Implement road restrictions and closures as warranted during periods of extreme fire danger.
3. Emphasize cooperative fire prevention activities.
4. Continue and improve fire prevention signing program on roads and trails included in or adjacent to the LSR/MLSA.
5. Emphasize contact with the following special interest groups: ORV groups, grazing permittees, summer home groups, organization camps, organized local user groups, and other special use permittees.
6. Emphasize fire prevention and wildfire risk awareness education for the public.
7. Emphasize wildfire risk awareness education for home/landowners in urban/wildland interface areas, such as: along US Hwy. 12, Rimrock, and along FS Road 1200 adjacent to lake.
8. Seek opportunities to initiate hazard reduction actions around private lands (e.g., summer homes/resorts near Rimrock and adjacent to US Hwy. 12, Camp Jubilee, Tieton Road (FS Road 1200), State University Survey Camp, Camp Dudley, Camp Prime Time, and Camp Zarahemla).
9. Emphasize fire prevention education for hunters.
10. Initiate hazard reduction actions around developed and dispersed recreation sites, such as:
    - Willows Campground
    - Lost Lake Campground
    - Hause Creek Campground
    - South Fork Campground
    - Grey Creek Campground
    - Clear Lake South Campground
    - Clear Lake Reservation Site
    - Indian Creek Campground
    - Section 3 Lake Campground
    - North Fork Tieton Trailhead
    - Dog Lake Campground
    - Thunder Lake
    - Lightning Lake
    - ETC... (Additional sites may be added if overlooked)
11. As a hazard reduction measure emphasize fuelwood collection in designated areas around recreation use sites.

12. Initiate hazard reduction actions around Westfall Seed Orchard, Louie Seed Orchard, and White Pass Work Center..
13. Initiate hazard reduction actions along roads such as, Short and Dirty Ridge Road (FS Road 637).

c) Pre-fire Protection from Fires Originating Outside the LSR/MLSA

The following methods are proposed to protect the LSR/MLSA from fires originating outside LSR/MLSA boundaries.

1. Maintain and manage existing fuel breaks.
2. Complete pre-attack planning process for the LSR/MLSA. Utilize natural fuel breaks when possible.
3. Maintain existing pre-attack facilities/agreements (e.g., water chances, helispots, fire camps, etc.) Seek opportunities for more.
4. Emphasize fire prevention activities to prevent the spread of wildfire into the LSR/MLSA.
5. Utilize cooperative law enforcement agreements to emphasize the inspection of spark arrestors and exhaust systems.
6. Strategic fuel manipulation to reduce size and intensity of fires within and adjacent to LSR/MLSA boundaries (e.g., pruning, thinning, fuel breaks). Provide a change in the continuity/arrangement of, at risk, vegetation/fuels. Emphasis to utilize existing fuel treatment areas, natural openings, roads, ridgetops, etc. Priority areas: Bethel Ridge, Russell Ridge, US Hwy. 12, Short and Dirty Ridge, FS Roads 1202/1203.
7. Emphasize roadside fuel modification, fuelwood collection, and fire prevention activities.
8. For more specific information, refer to Sustainability and Disturbance modules for this LSR/MLSA.

d) Fire Detection

1. Aerial detection, after lightning episodes, will provide the primary detection resource for this LSR/MLSA.
2. This may be supplemented with emergency staffing at Jumpoff Lookout, during and after lightning episodes.
3. Emphasize fire reporting procedures with local residents, users, and cooperators.

e) Wildfire Suppression

1. Spotted owl activity centers are the highest priority for protection of resources (following protection of human life and improvements). All wildfires in the 1.8 mile buffer will be suppressed at minimum acres.
2. Pre-planned dispatch cards for initial attack will be prepared for the LSR/MLSA area.
3. The FSA and Escaped Fire Situation Analysis process will be used to guide initial attack, extended attack, and large fire-suppression. Utilize pre-attack plans and materials.
4. Tactical suppression activities will take into consideration, to protect from wildfire, specific resource values; such as private land, late-successional habitat, and riparian reserves.

5. Improvements will be a priority for protection (e.g., historic/cultural sites, recreation sites).
6. Priority for protection of White Pass Work Center, Westfall Seed Orchard, and Louie Seed Orchard.
7. Protect known threatened and endangered species habitat from wildfire (i.e., plant or animal).
8. Fire suppression actions will be implemented on an interagency basis as appropriate.

f) Vegetation and Fuels Management

1. Manage for a mosaic of age classes and structural conditions across the landscape to support late-successional habitat.
2. Provide conditions for sustainable dry forest types.
3. Manage for mesic sites with high density, multi-story refugia.
4. Suggested management tools to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction include: pruning, commercial and pre-commercial thinning, wood gathering, mechanical treatments, and prescribed fire.
5. Vegetation and fuel treatment methods to facilitate meadow restoration projects.
6. Emphasize roadside fuel modification, fuelwood collection, and fire prevention activities.
7. For more specific information, refer to Sustainability and Disturbance modules for this LSR/MLSA.

g) Prescribed Fire Opportunities

1. Recognize the use of prescribed fire as a management tool in this LSR/MLSA and in areas adjacent to this LSR/MLSA.
2. Priority outcomes throughout the LSR/MLSA are to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction.
3. Prescribed fire projects in whitebark pine/subalpine larch ecosystems are encouraged to increase amounts of whitebark pine.
4. Application of prescribed fire to facilitate meadow restoration projects.
5. Projects should be of scale/location to enhance landscape-level diversity tied to inherent disturbance regimes.
6. Projects should attempt to minimize risk of future catastrophic wildfires (those outside the range of inherent disturbance regimes with respect to size and/or severity).
7. For more specific information, refer to Sustainability and Disturbance modules for this LSR/MLSA.

h) Summary

Fire prevention, fire detection, wildfire suppression, vegetation and fuels management, and prescribed fire are all appropriate, integral elements of the overall management of this LSR/MLSA.

D. Restoration Opportunities and Potential Project Summary

Table VIII-26, Restoration Opportunities and Potential Projects, Tieton LSR and Lost Lake and Russell Ridge MLSAs.

Analysis Module	Restoration Opportunity	Potential Projects	Sched-ule[1]
Forest-Wide Sustain-ability	1) Reduce stand density in dense successionally advanced (types 12 and 22) where they exist between the Tieton , Lost Lake and Russell Ridge LSR/MLSAs.	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in the disturbance module treatment key. Favor the development of seral species such as ponderosa pine and western larch. Locate and prescribe treatments to make landscape level changes in fire susceptibility.	A
	2) Encourage private landowners in the lower Tieton and Rattlesnake watersheds to take similar density management as described in 1 above	2) See 1 above.	B
	3) Improve or maintain existing fuelbreaks (U.S. Highway 12 and road to Sleepy Park Springs.)	3) Piling of down fuels, firewood gathering, pruning, shaded fuel breaks, and encouragement of less flammable deciduous vegetation.	A
	4) Reduce fuel loading in young stands.	4) Precommercial thinning.	C
Forest-Wide Spotted owl	Not Applicable. (Neither of these three LSR/MLSAs is one of the 3 LSRs on the forest designated as a source population area.)	Not Applicable.	
Forest-Wide Connec-tivity	None Identified. Breaks in connectivity identified are inherent to the landscape.	None Identified	
Unique Habitats & Species	1) Reduce road densities in riparian reserves (Wildcat Creek and Lost Lake areas).	1) Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	2) Reduce road densities in Forest Interior (South Fork Tieton, Wildcat and Indian Creeks).	2) Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A

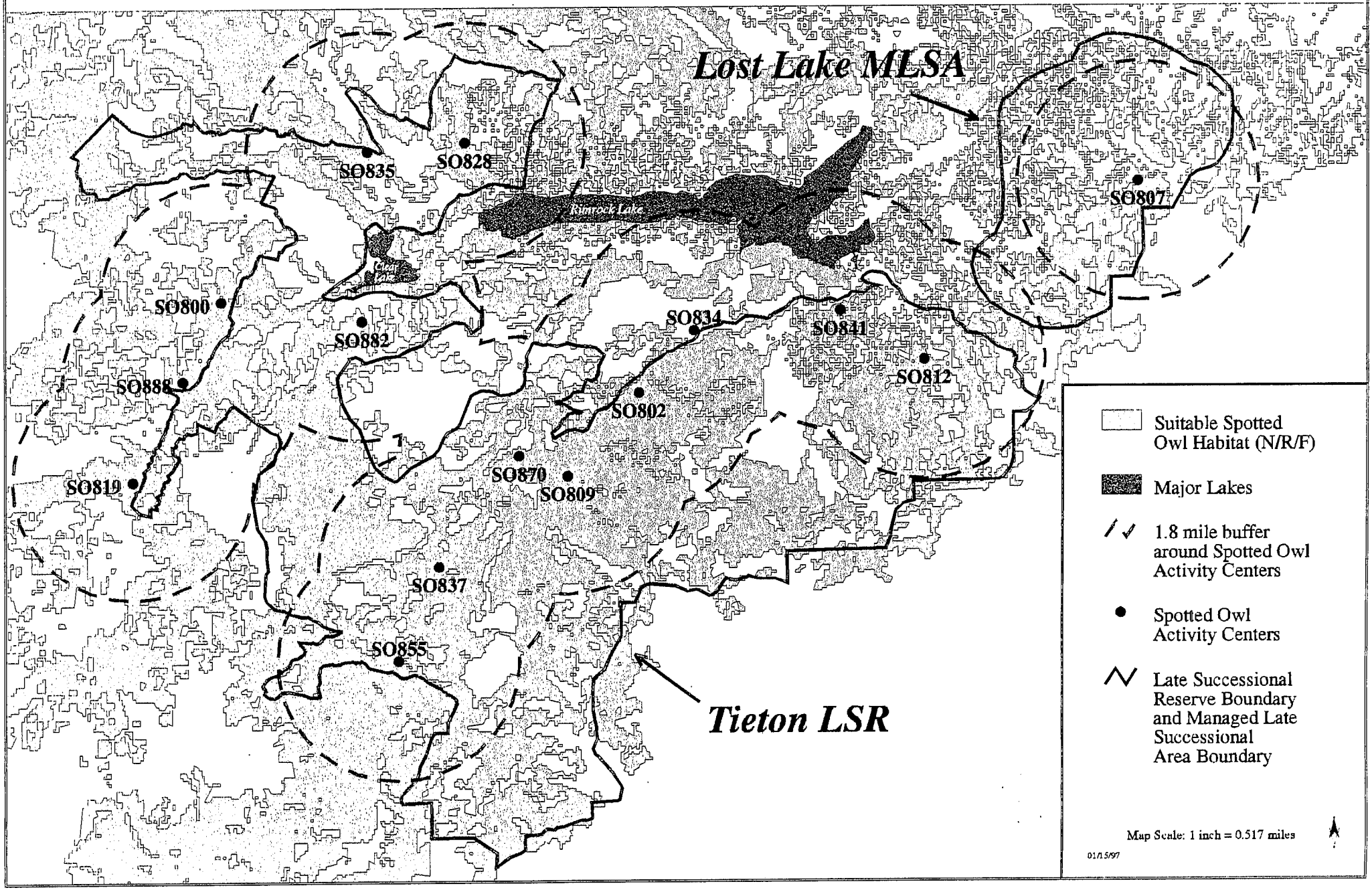
Analysis Module	Restoration Opportunity	Potential Projects	Schedule[1]
	3) Retain whitebark pine forests and subalpine meadows.	3) Prescribed fire.	B
Connectivity Within the LSR	1) Promote the development of fire climax stands within the dry forest vegetation group.	1) Thin from below favoring ponderosa pine. Use prescribed fire where current fuel loadings permit the attainment of objectives.	A
	2) Increase the amount of interior forest area within the LSR.	2) Close roads near interior forest an in dry forest areas as opportunities are identified through Access and Travel Management Planning.	B
	3) Improve the function of riparian reserves as connectivity corridors.	3) Close roads within riparian reserves as opportunities are identified through Access and Travel Management Planning.	B
Disturbance	1) Reduce the risk of habitat loss to wildfire by reducing stand density, altering species composition and reducing vertical and horizontal fuel continuity in dry forest types.	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in disturbance module treatment key. Favor the development of seral species such as ponderosa pine. Priorities should be 1) Dispersal habitat. 2) NRF habitat within the LSR/MLSA but outside of owl circles, 3) NRF habitat within the owl circle on above threshold acres, (owls #'s 802, 809, 837, 855 and 870) 4) See item #2 under spotted owl for treatment of NRF habitat on threshold acres.	A
Spotted Owl	1) See Appendix 39, Northern Spotted Owl Nest Site Protection Within LSRs and MLSAs.		A
	2) Improve sustainability of dense dry forest (vegetation Type 12) within 0.7 to 1.8 mile home range area on threshold acres. Treatment should maintain suitability	2) Utilize commercial thinning, pruning and fuelwood collection.	A

Analysis Module	Restoration Opportunity	Potential Projects	Sched-ule[1]
	of habitat for nesting, roosting and foraging. (see spotted owl desired conditions)		
	3) Accelerate the development of suitable spotted owl habitat. Focus on wet dispersal habitat. (owl #831 in Russell Ridge MLSA)	3) Utilize Silvicultural activities that accelerate the development of multi-layered stands. Focus on single layered pole size stands in moist grand fir and wet forest groups. This option appears limited to owl #831 but may be extended to owl #864 if wet dispersal habitat is present..	C
	4) Improve sustainability of dense dispersal habitat (codes 13 and 21)	4) Utilize commercial thinning, pruning and fuelwood collection.	A
	5) Obtain information on spotted owl locations.	5) Survey areas to 1994 spotted owl protocol.	B
Aquatic	1) See late successional habitat implications in Aquatic section.	1) Coordinate projects with Tieton Watershed Assessment.	B
Noxious Weed	1) Limit the extent and spread of *Linnaria dalmatica, Cytisus scoparius, Senecio jacobea, Hypochaeris radicata, Chrysanthemum luecanthemum, Centaurea diffusa* and *C. maculosa* within the LSR and MLSAs.	1) Consider treatments such as hand pulling and herbicides to limit extent and spread.	A
	2) Increase knowledge regarding noxious weed presence in the LSR and MLSAs.	2) Survey LSR and MLSAs for presence of noxious weeds.	C
Fire Plan	1) Protect LS values from loss due to wildfire	1) See fire plan for specific actions	

1 Implementation Schedule; (A) = within 1 year; (B) = within 3 years; (C) = within 5 years

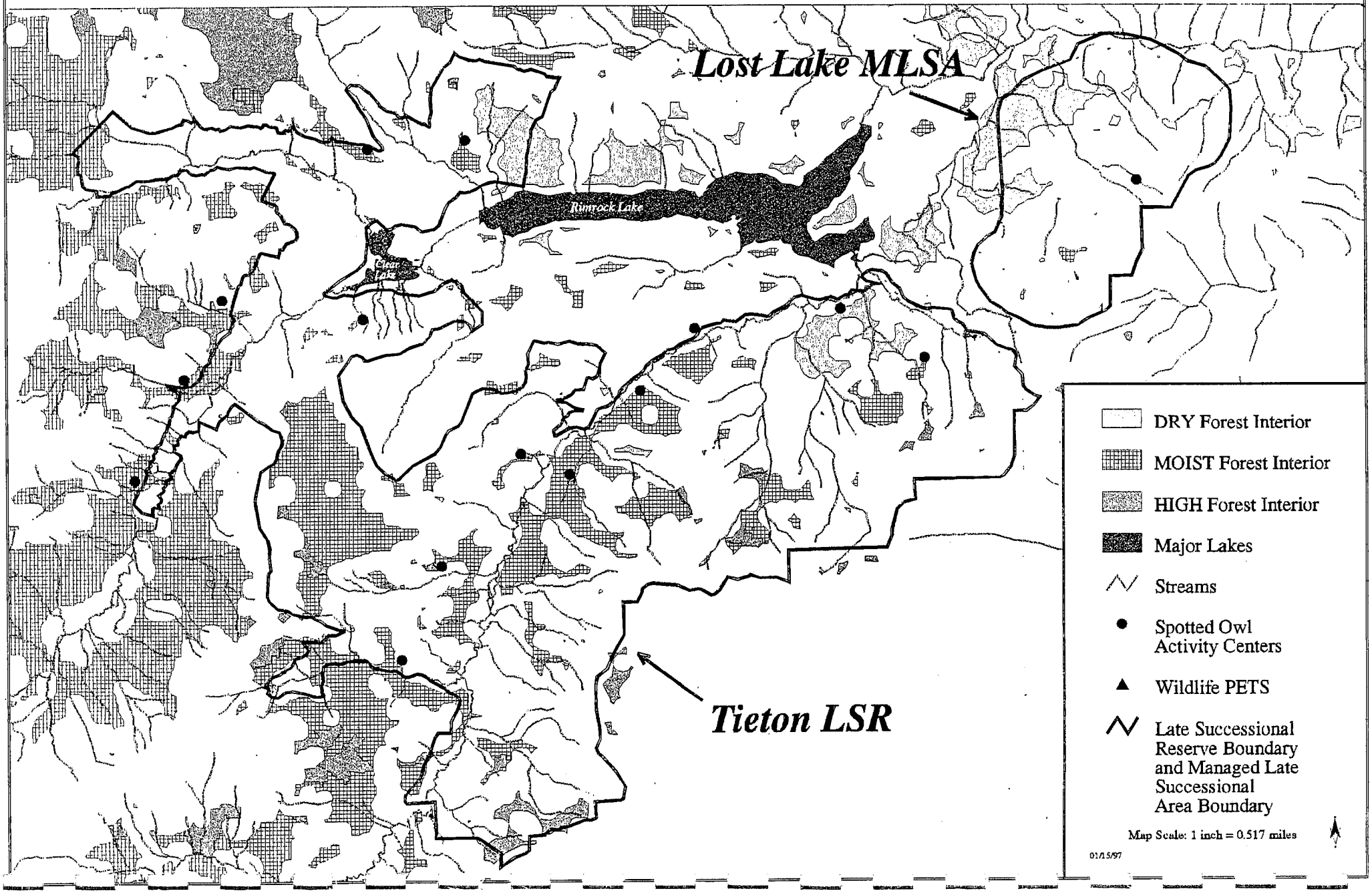
Tieton Late Successional Reserve and Lost Lake Managed Late Successional Area

SUITABLE SPOTTED OWL HABITAT



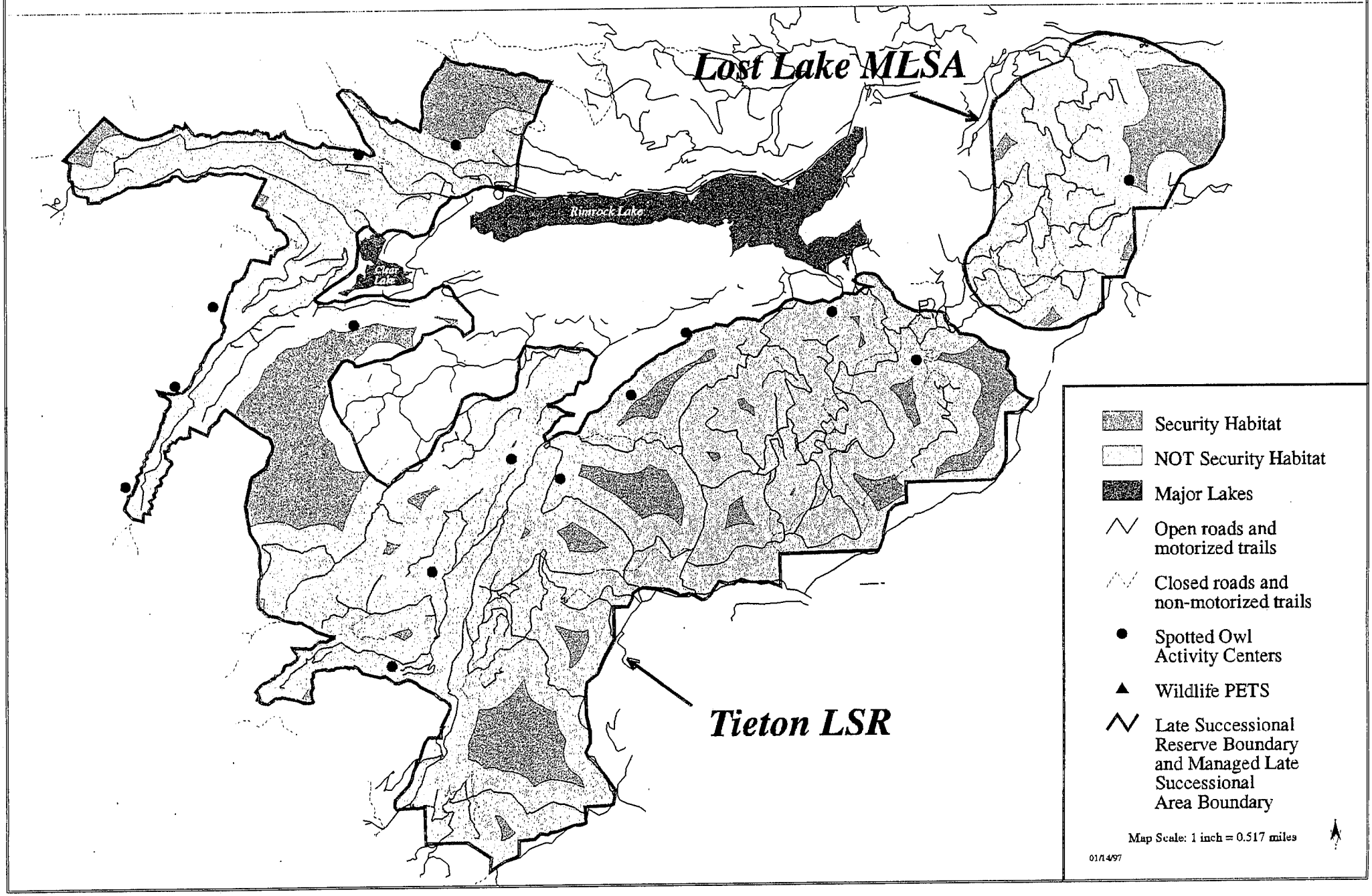
Tieton Late Successional Reserve and Lost Lake Managed Late Successional Area

FOREST INTERIOR



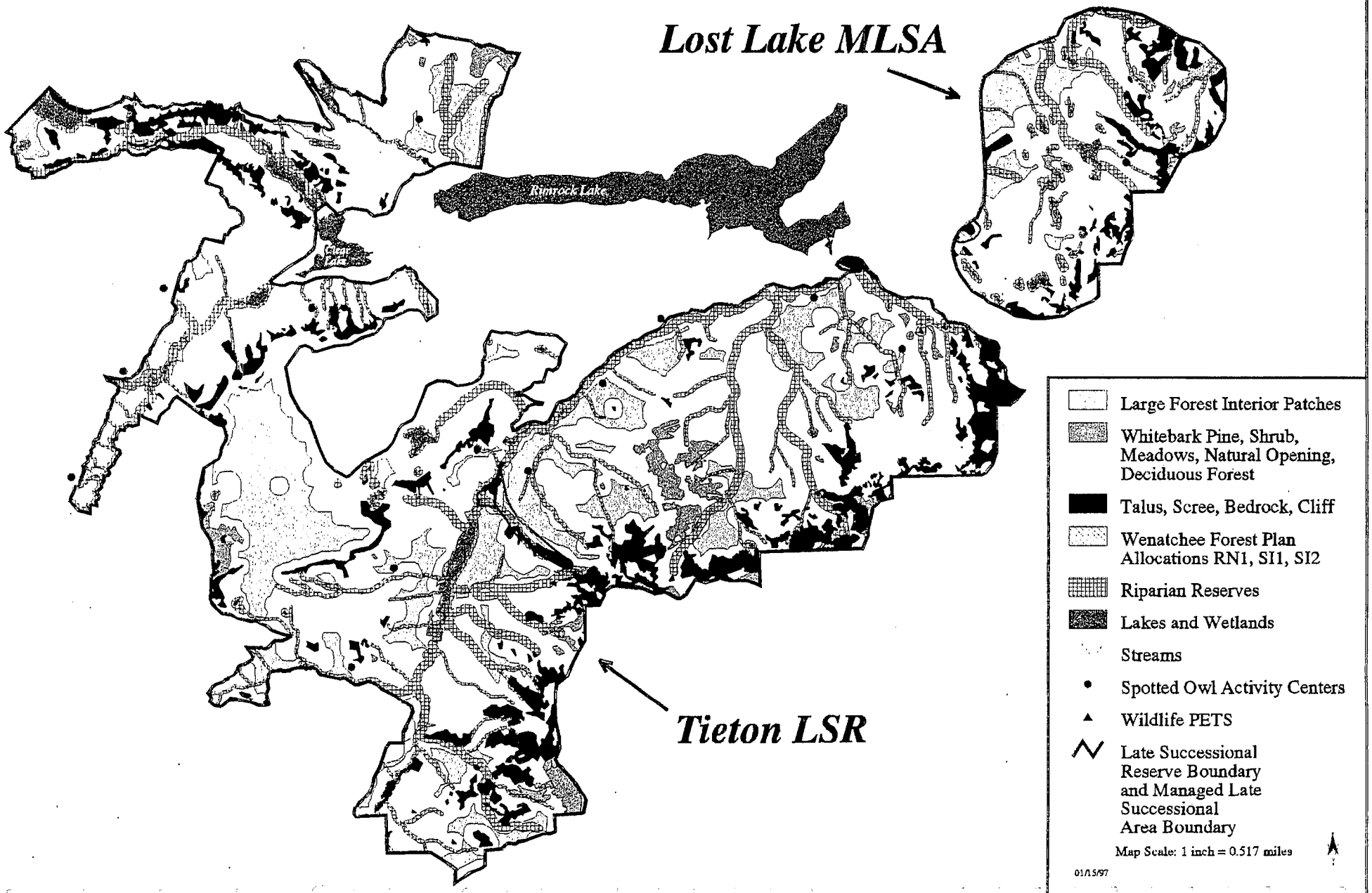
Tieton Late Successional Reserve and Lost Lake Managed Late Successional Area

SECURITY HABITAT



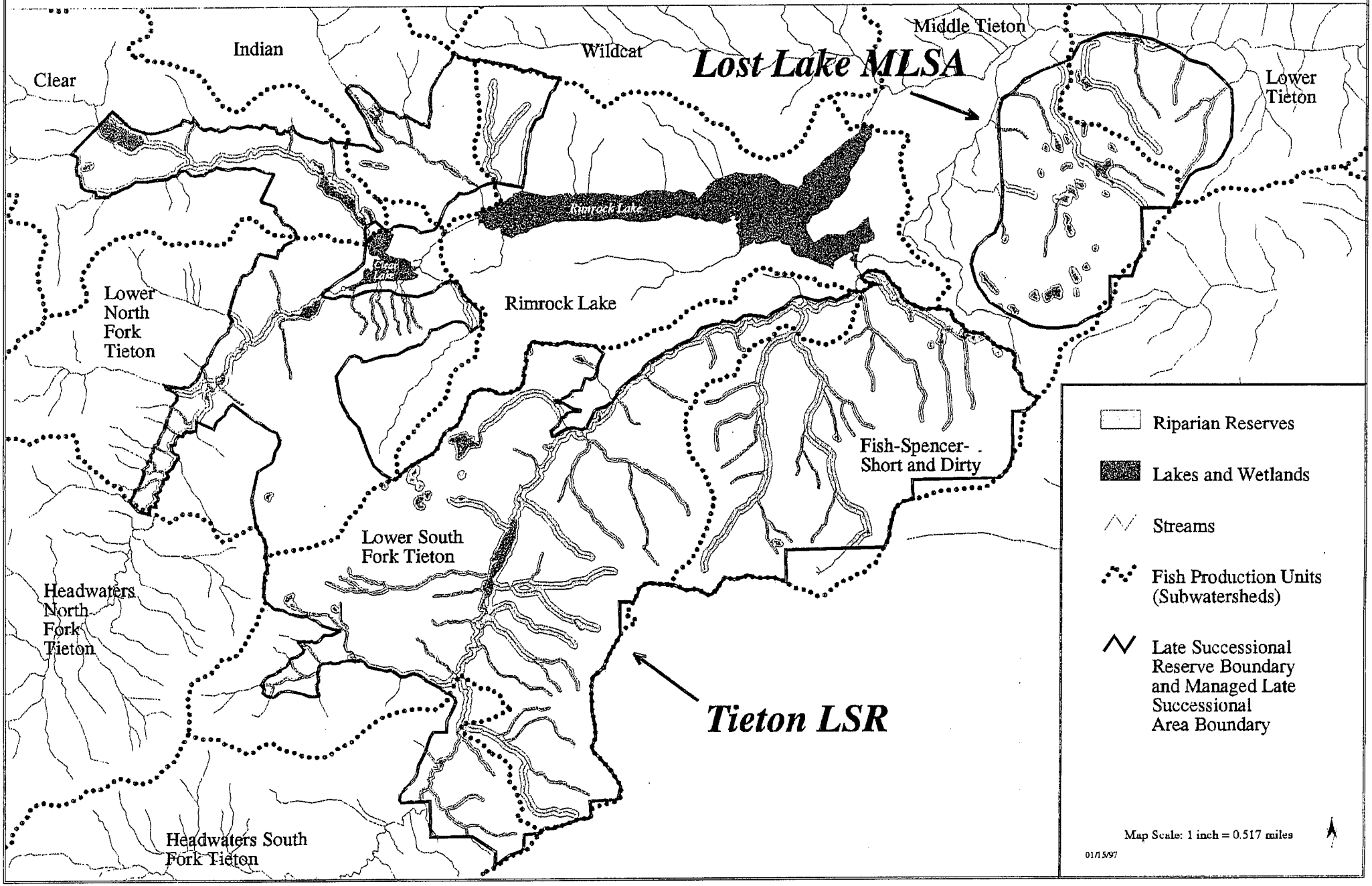
Tieton Late Successional Reserve and Lost Lake Managed Late Successional Area

UNIQUE HABITATS



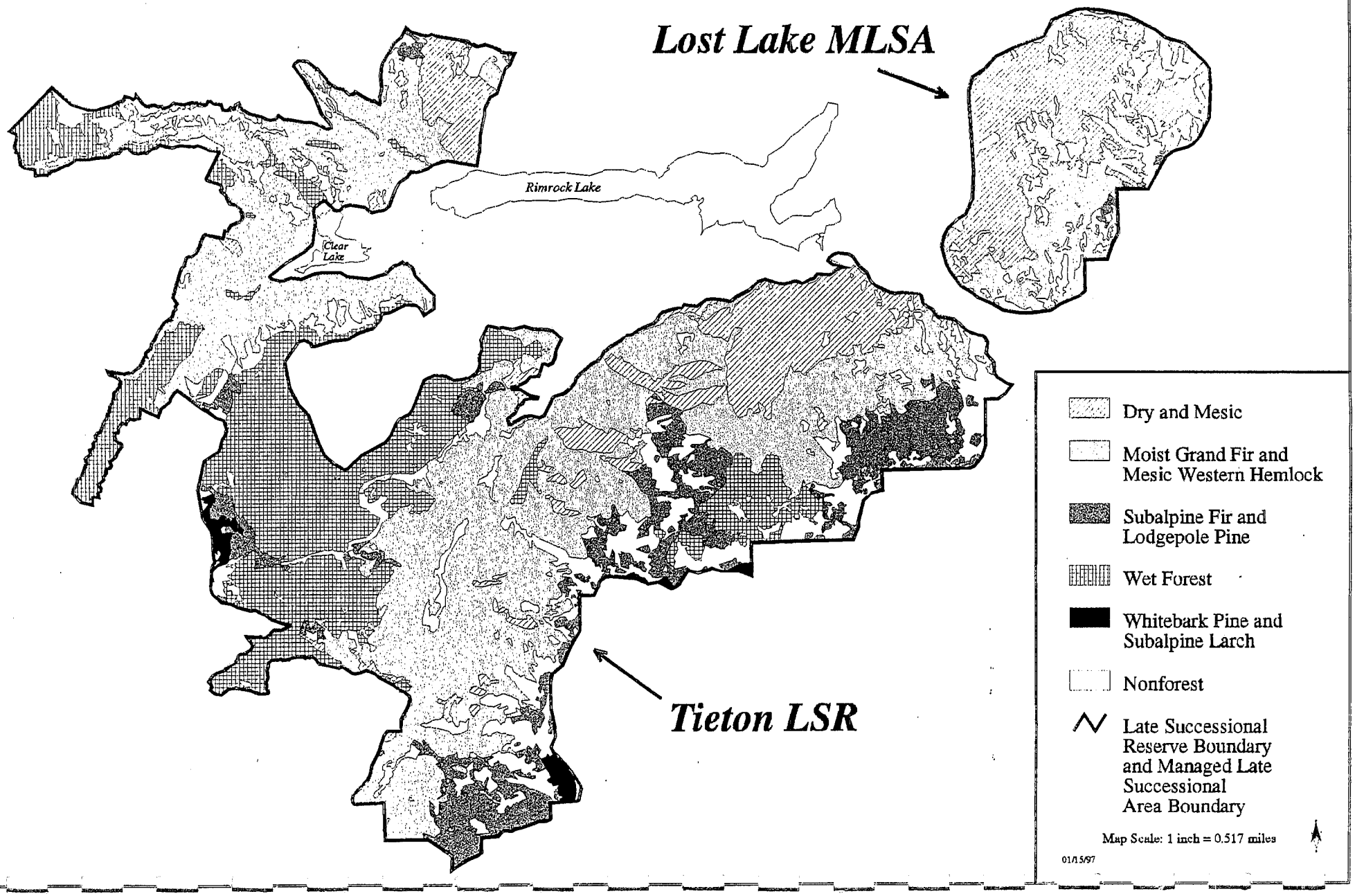
Tieton Late Successional Reserve and Lost Lake Managed Late Successional Area

FISH PRODUCTION UNITS (SUBWATERSHEDS)



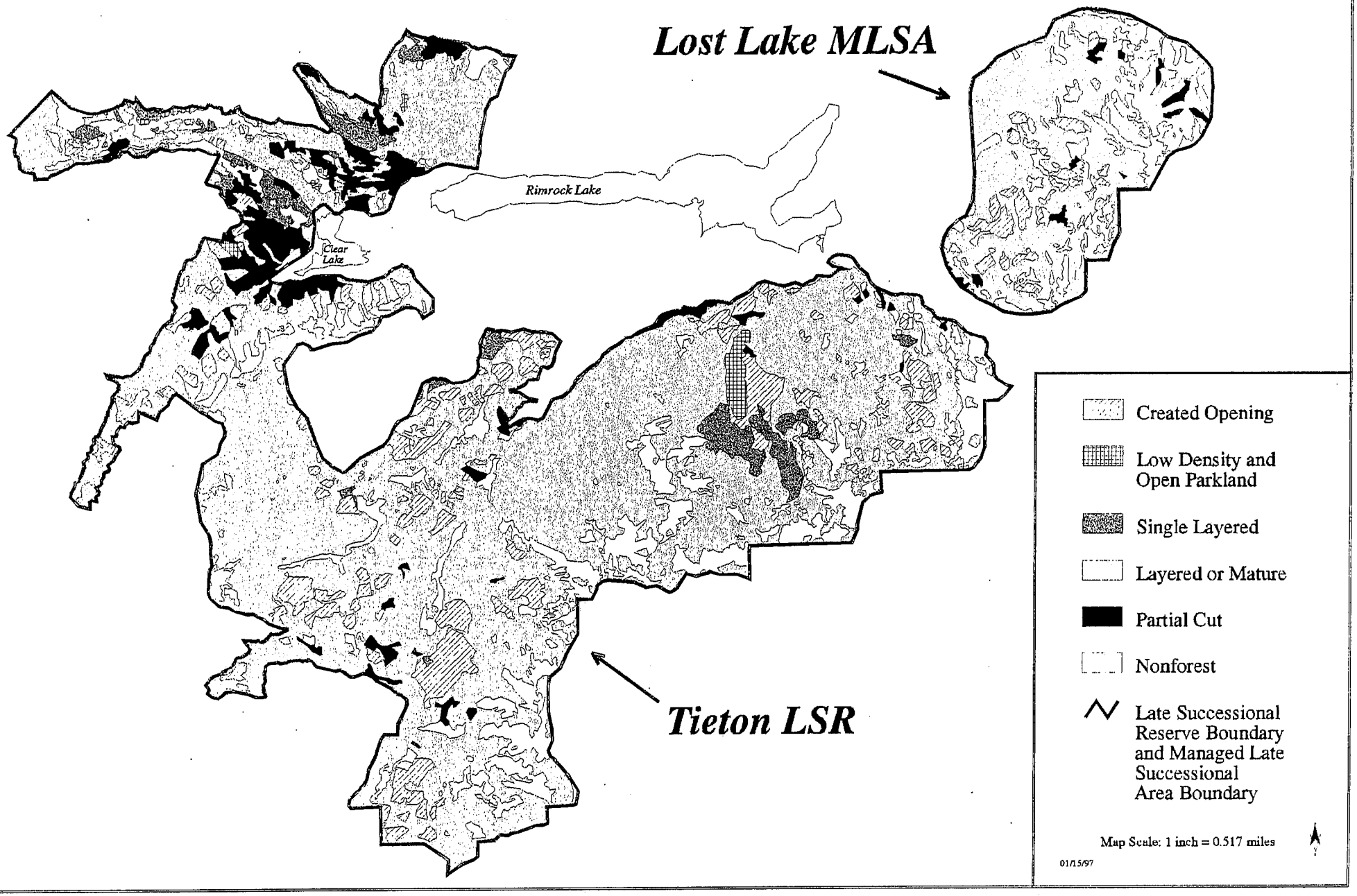
Tieton Late Successional Reserve and Lost Lake Managed Late Successional Area

VEGETATION SERIES



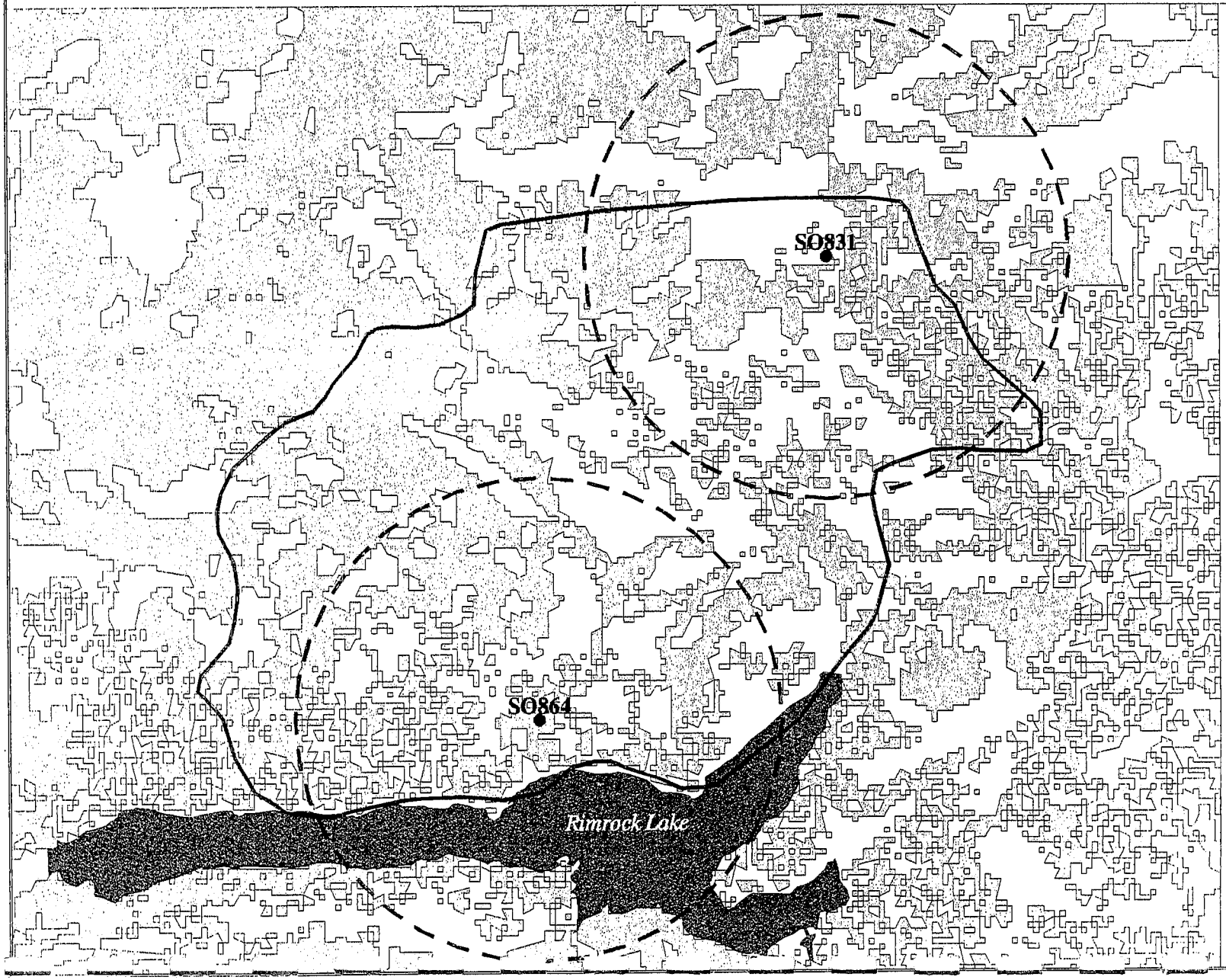
Tieton Late Successional Reserve and Lost Lake Managed Late Successional Area

VEGETATION STRUCTURE



Russell Ridge Managed Late Successional Area

SUITABLE SPOTTED OWL HABITAT



Suitable Spotted Owl Habitat (N/R/F)

Major Lakes

1.8 mile buffer around Spotted Owl Activity Centers

Spotted Owl Activity Centers

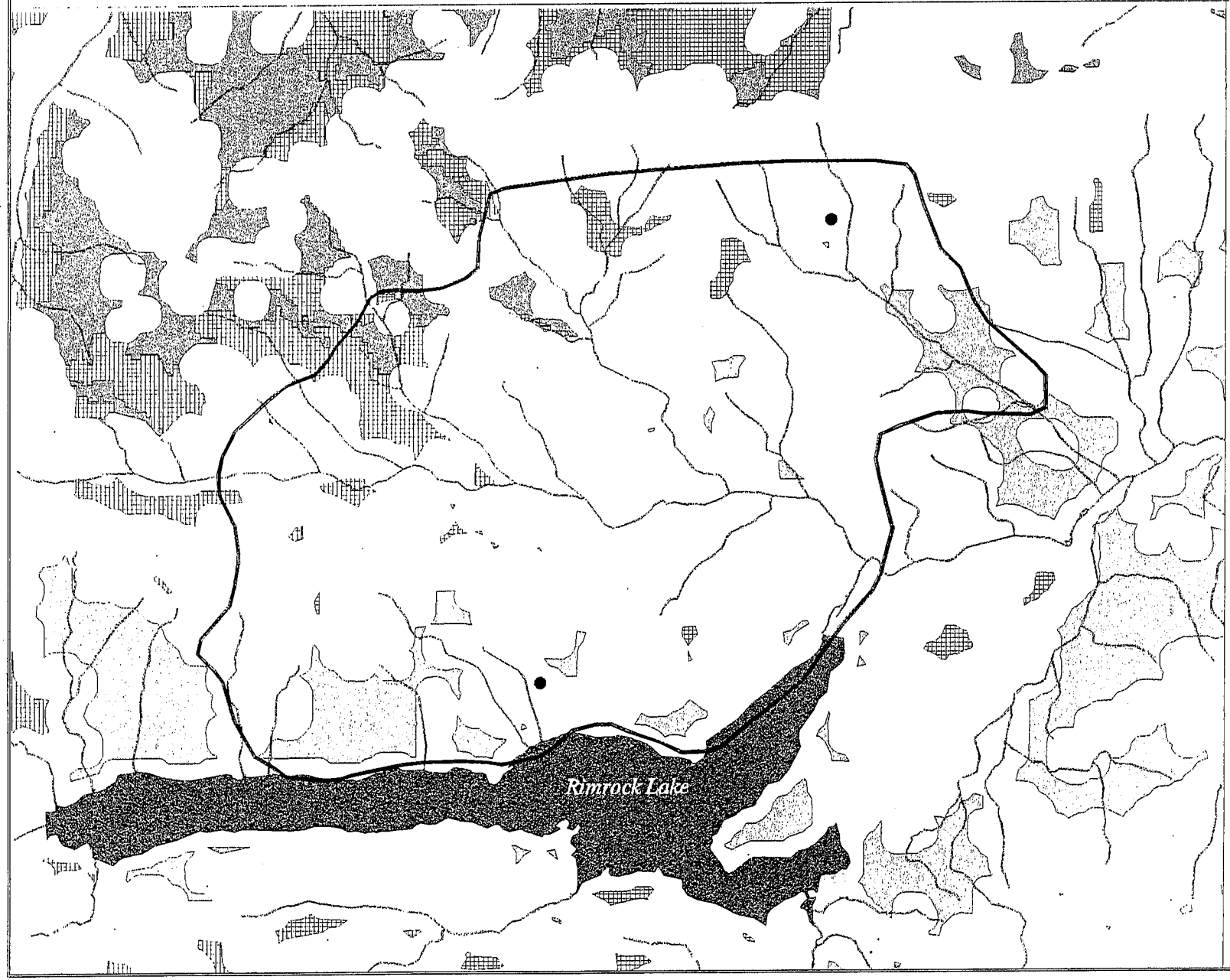
Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.915 miles

01/14/97

Russell Ridge Managed Late Successional Area

FOREST INTERIOR



DRY Forest Interior

MOIST Forest Interior

HIGH Forest Interior

Major Lakes

Streams

Spotted Owl Activity Centers

Wildlife PETS

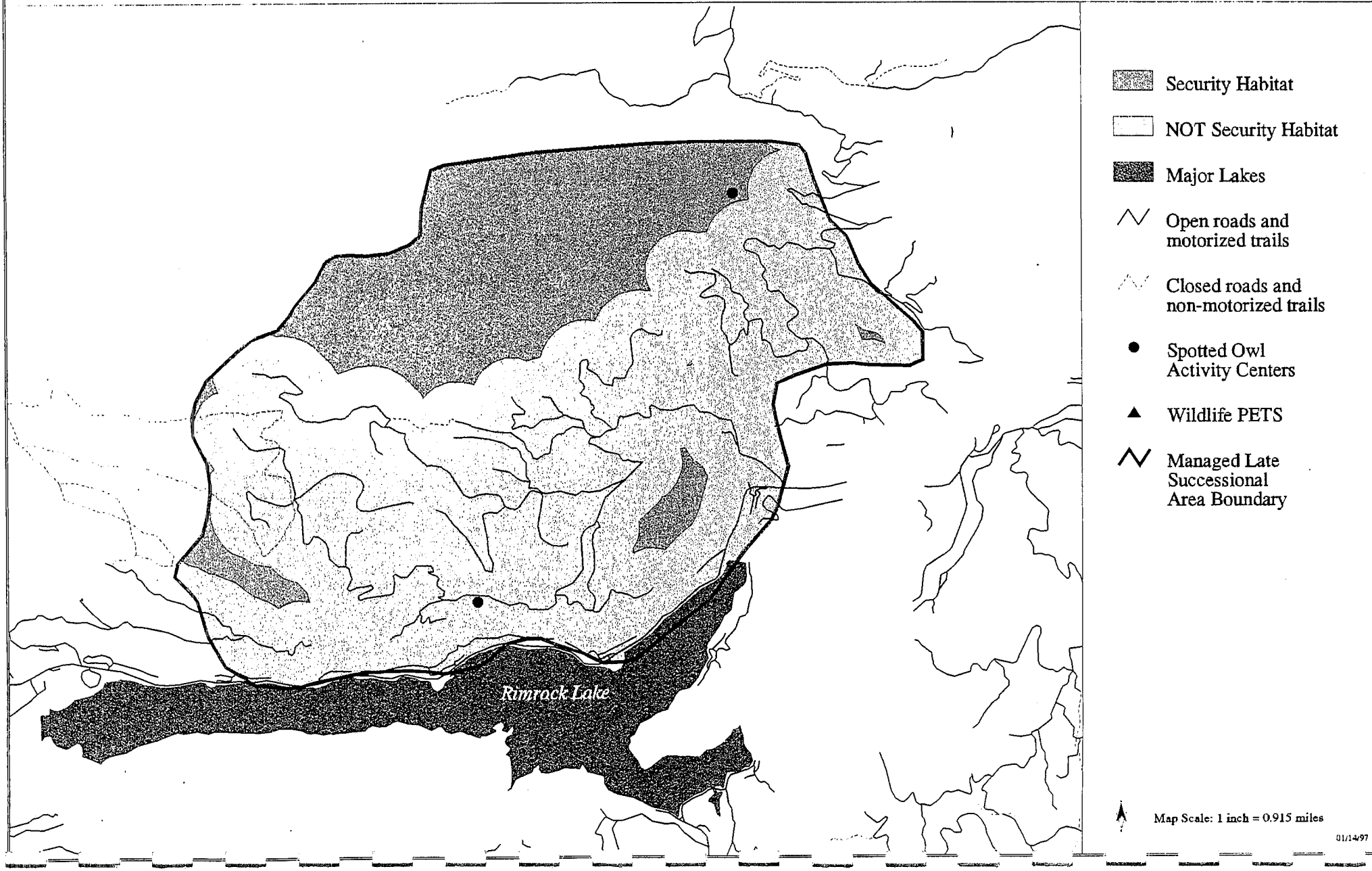
Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.915 miles

01/14/97

Russell Ridge Managed Late Successional Area

SECURITY HABITAT



Russell Ridge Managed Late Successional Area

UNIQUE HABITATS

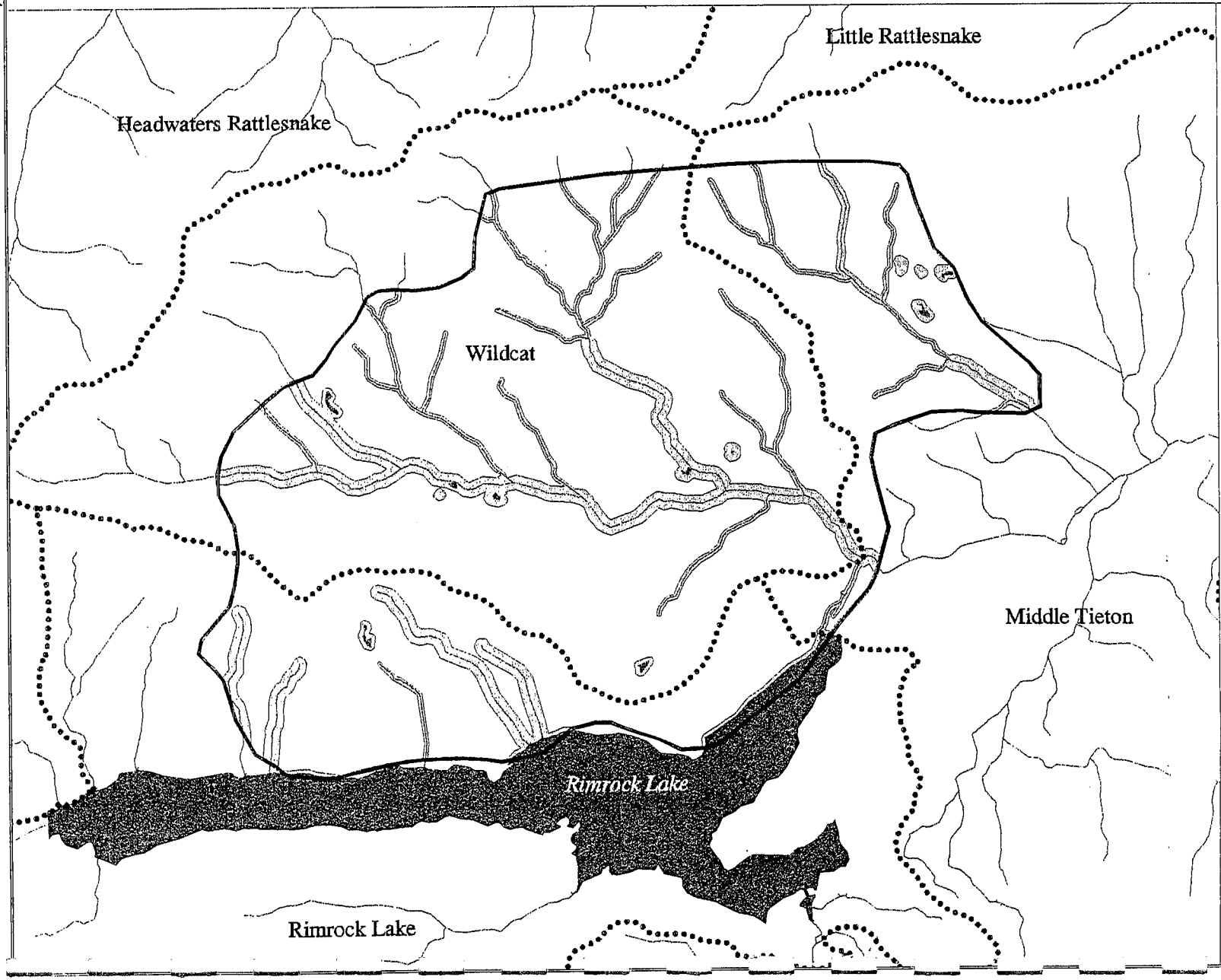
- Large Forest Interior Patches
- Whitebark Pine, Meadows, Shrub, Natural Opening, Deciduous Forest
- Talus, Scree, Bedrock, Cliff
- Wenatchee Forest Plan Allocations RN1, SI1, SI2
- Riparian Reserves
- Lakes and Wetlands
- Streams
- Spotted Owl Activity Centers
- Wildlife PETS
- Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.915 miles

01/14/97

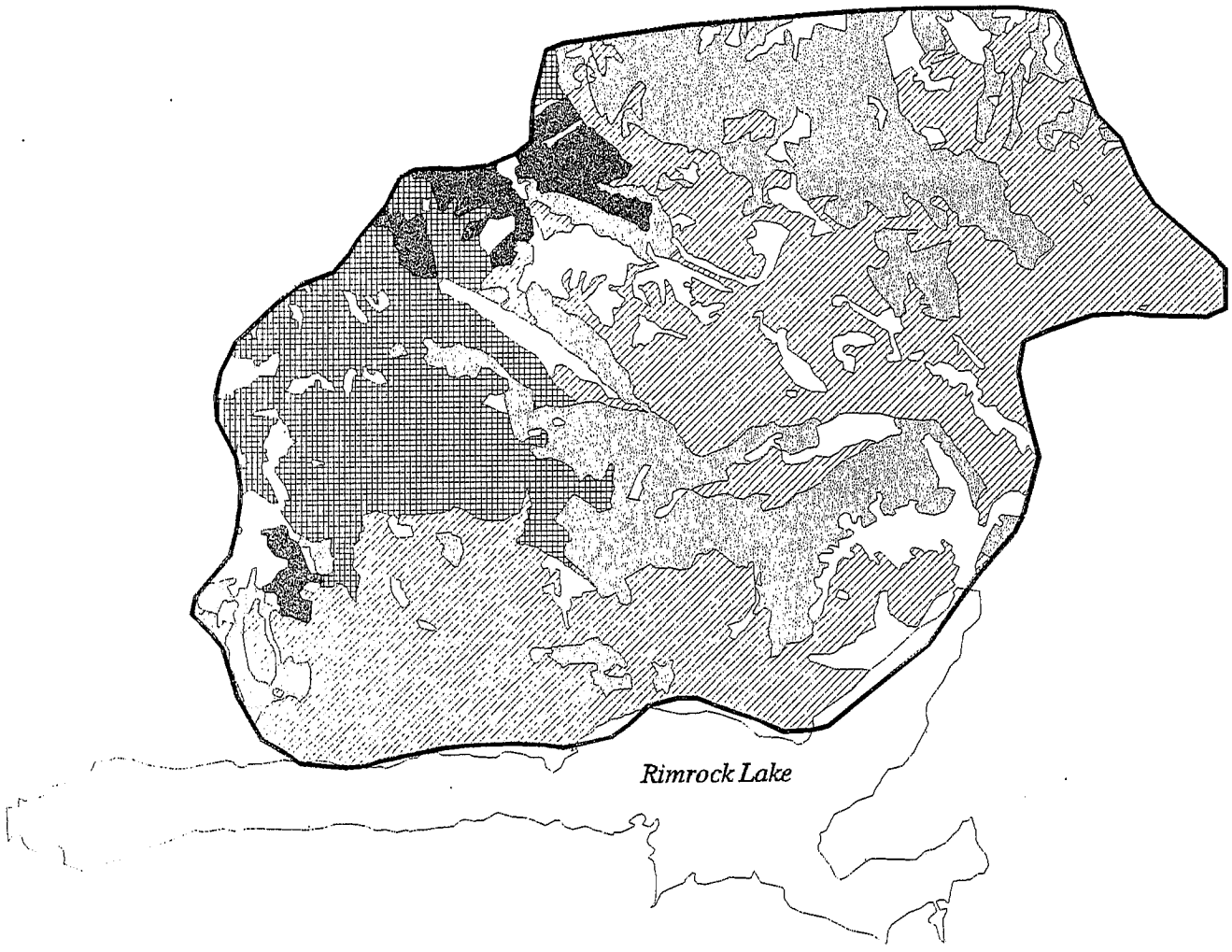
Russell Ridge Managed Late Successional Area

FISH PRODUCTION UNITS (SUBWATERSHEDS)



Russell Ridge Managed Late Successional Area

VEGETATION SERIES



- Dry and Mesic
- Moist Grand Fir and Mesic Western Hemlock
- Subalpine Fir and Lodgepole Pine
- Wet Forest
- Whitebark Pine and Subalpine Larch
- Nonforest
- Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.915 miles

01/14/97

Russell Ridge Managed Late Successional Area

VEGETATION STRUCTURE

Created Opening

Low Density and Open Parkland

Single Layered

Layered or Mature

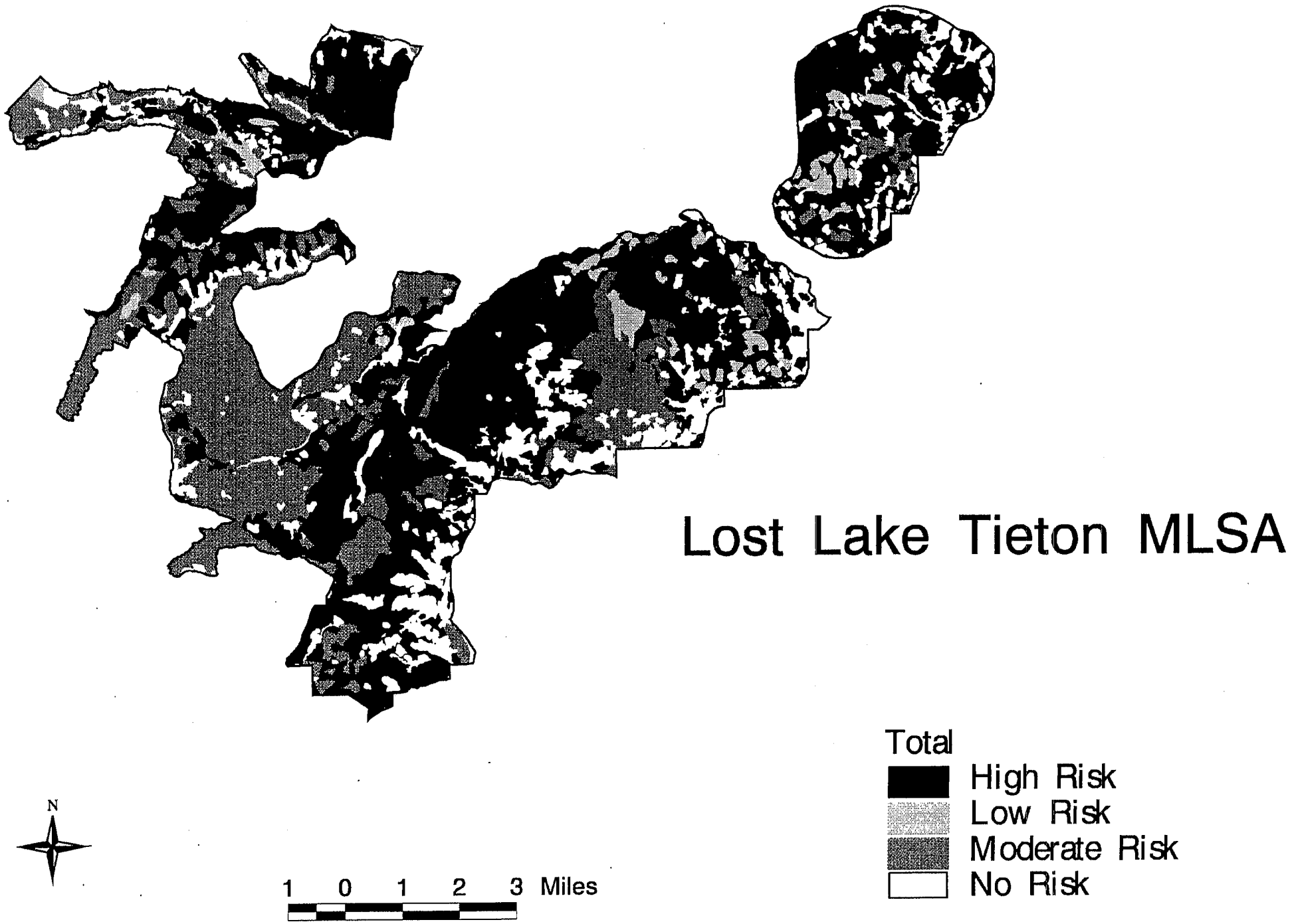
Partial Cut

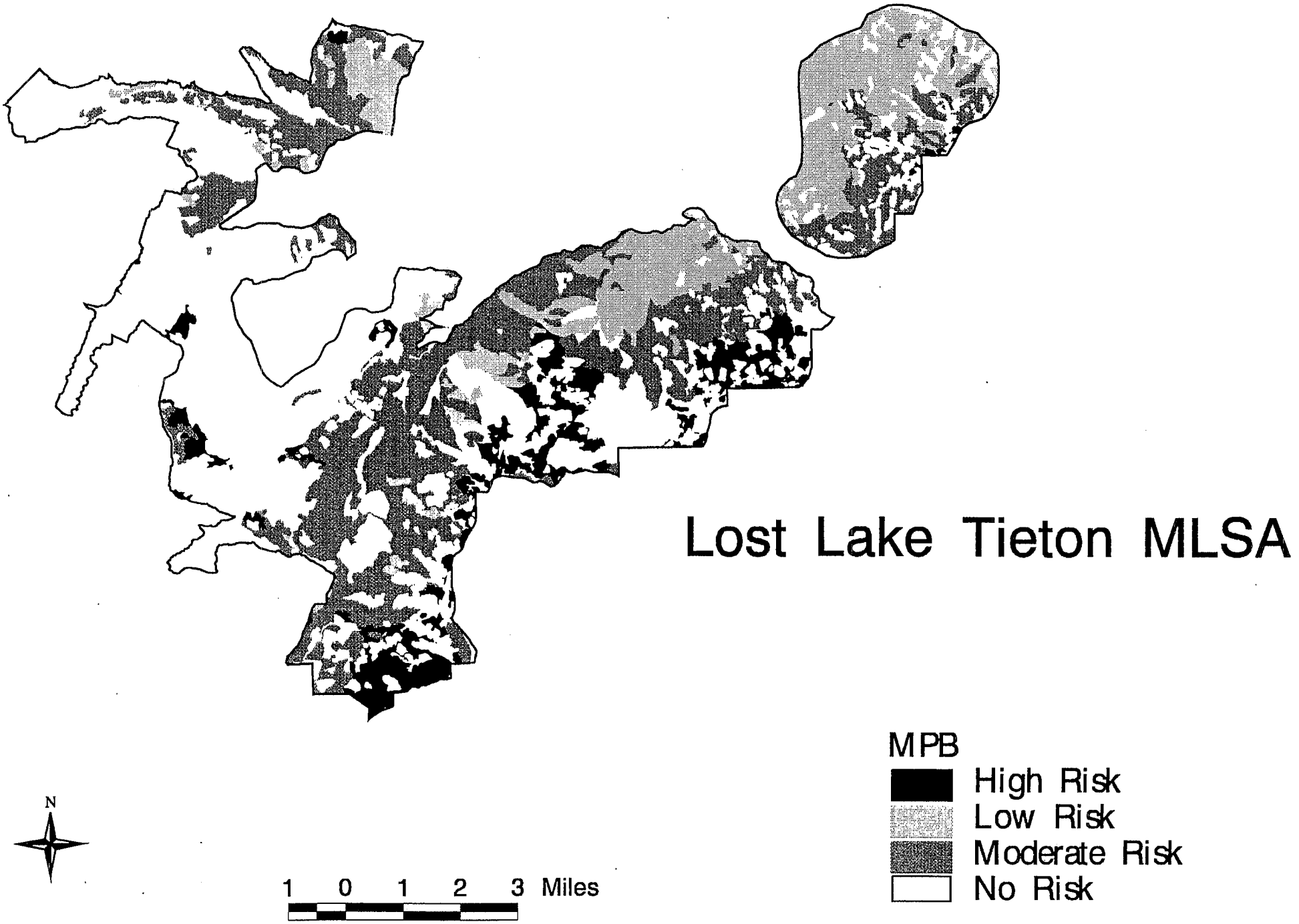
Nonforest

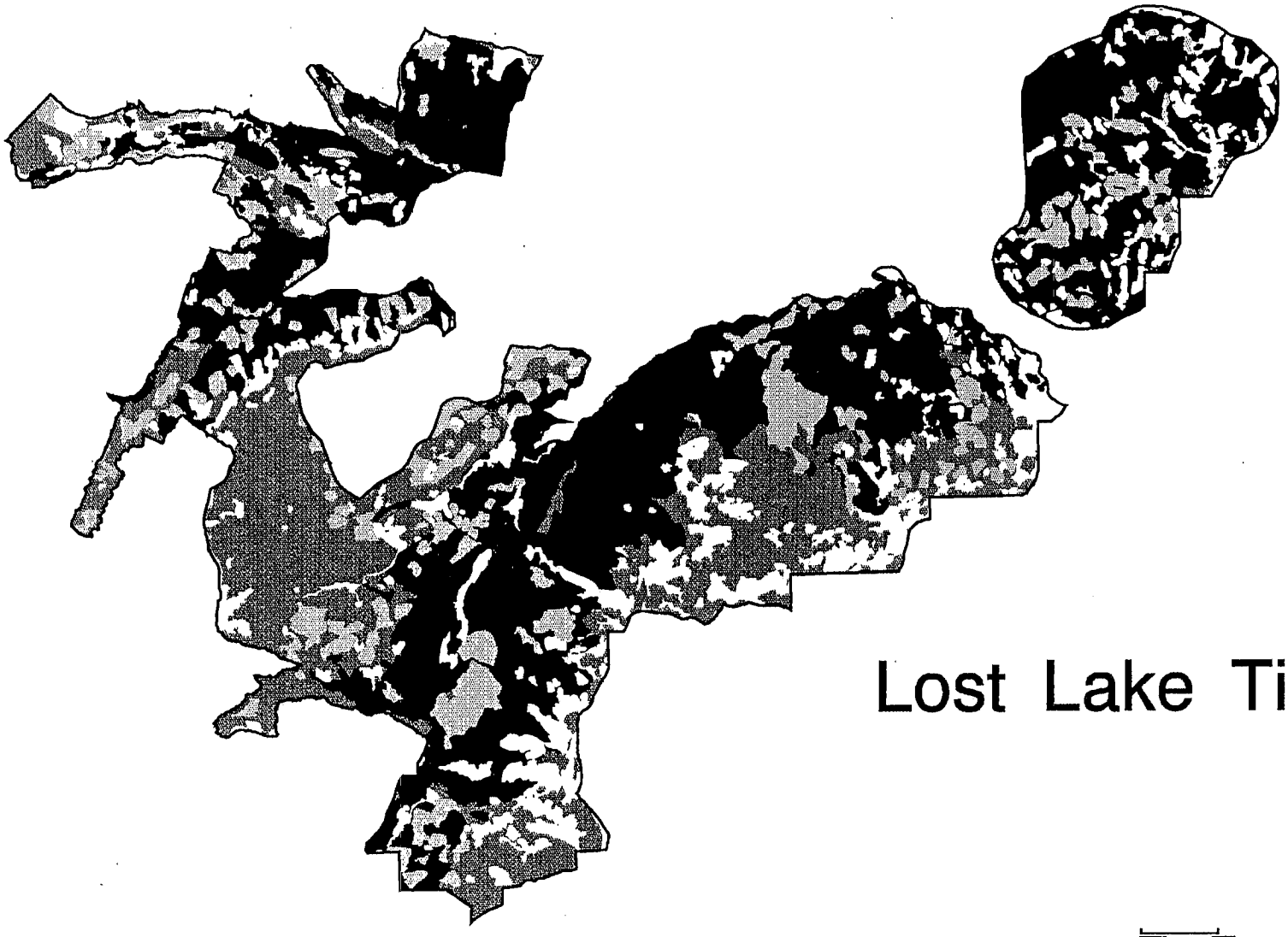
Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.915 miles

01/14/97


Lost Lake Tieton MLSA
Total
High Risk
Low Risk
Moderate Risk
No Risk
N
1 0 1 2 3 Miles


Lost Lake Tieton MLSA
MPB
High Risk
Low Risk
Moderate Risk
No Risk
N
1 0 1 2 3 Miles

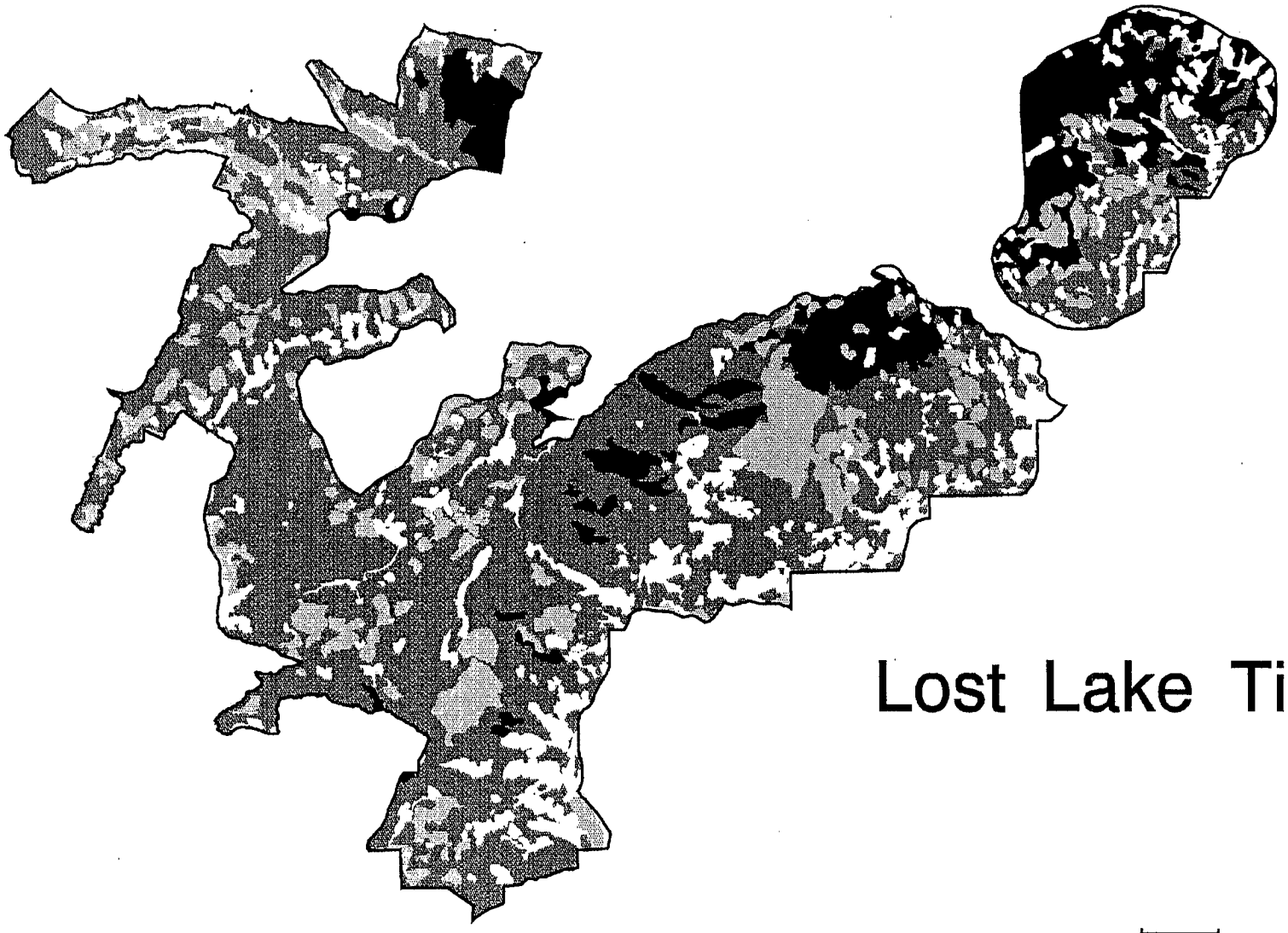


Lost Lake Tieton MLSA

Fir Engraver
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles

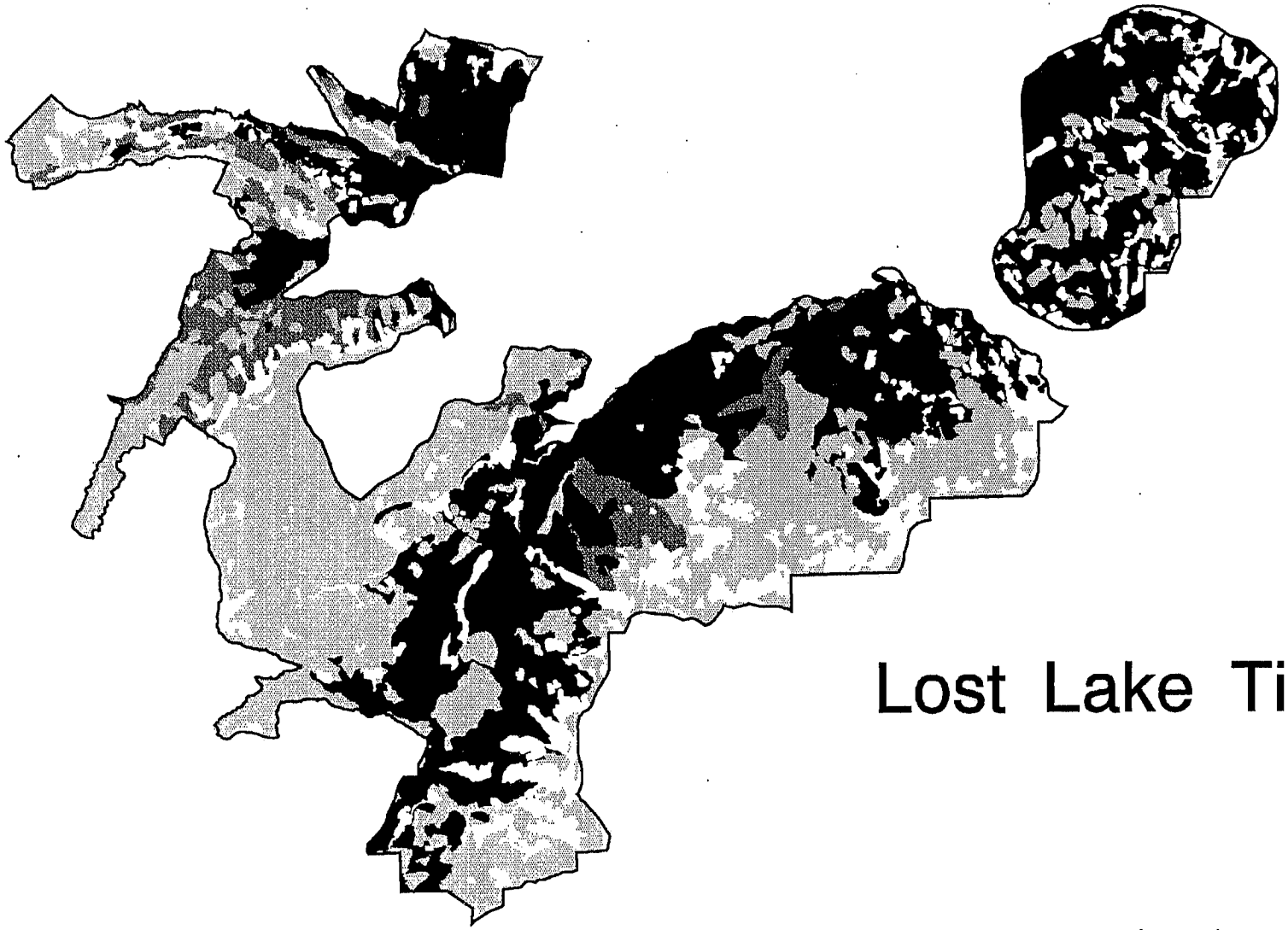


Lost Lake Tieton MLSA

DFB
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles

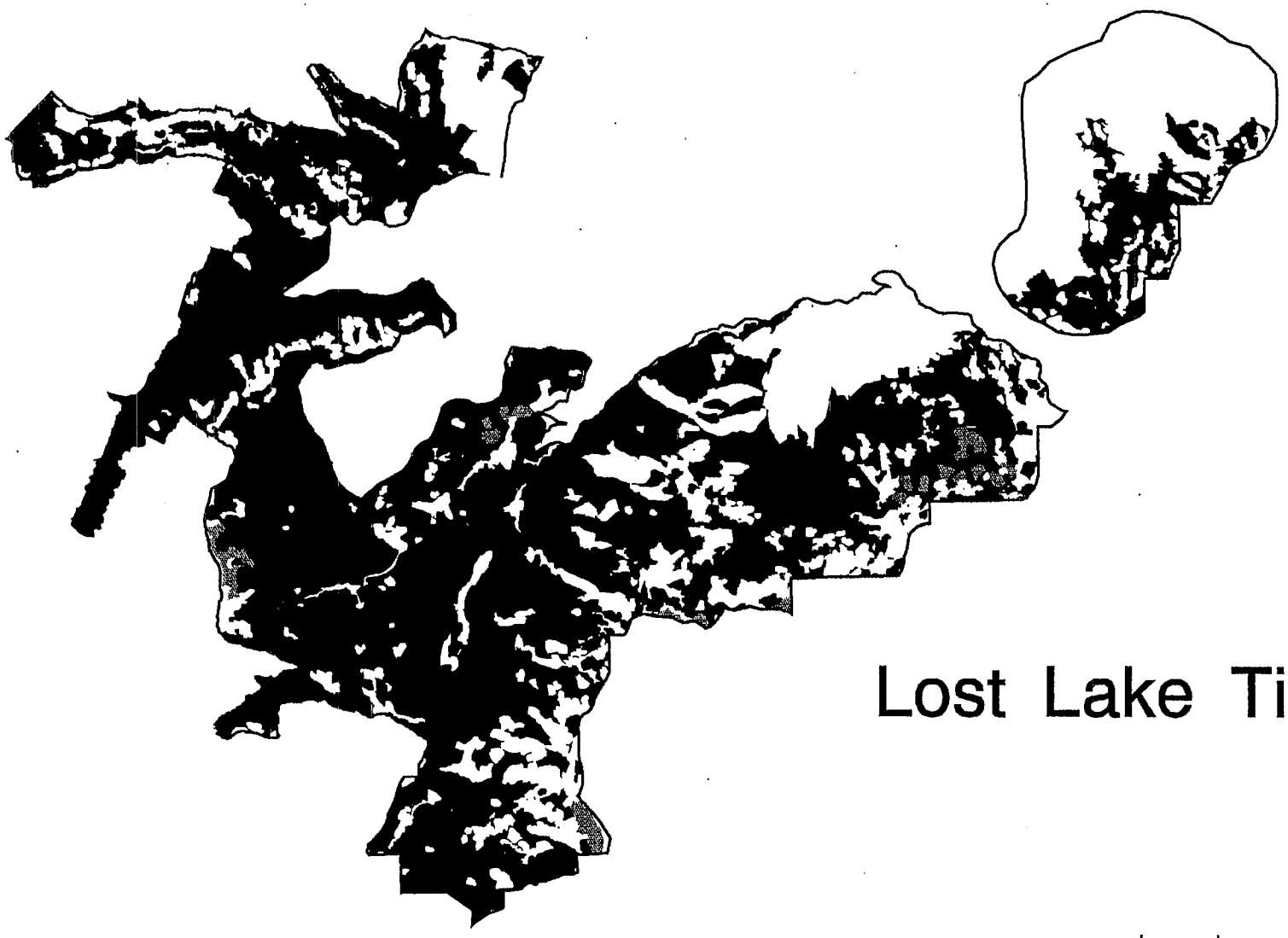


Lost Lake Tieton MLSA

WSB
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles

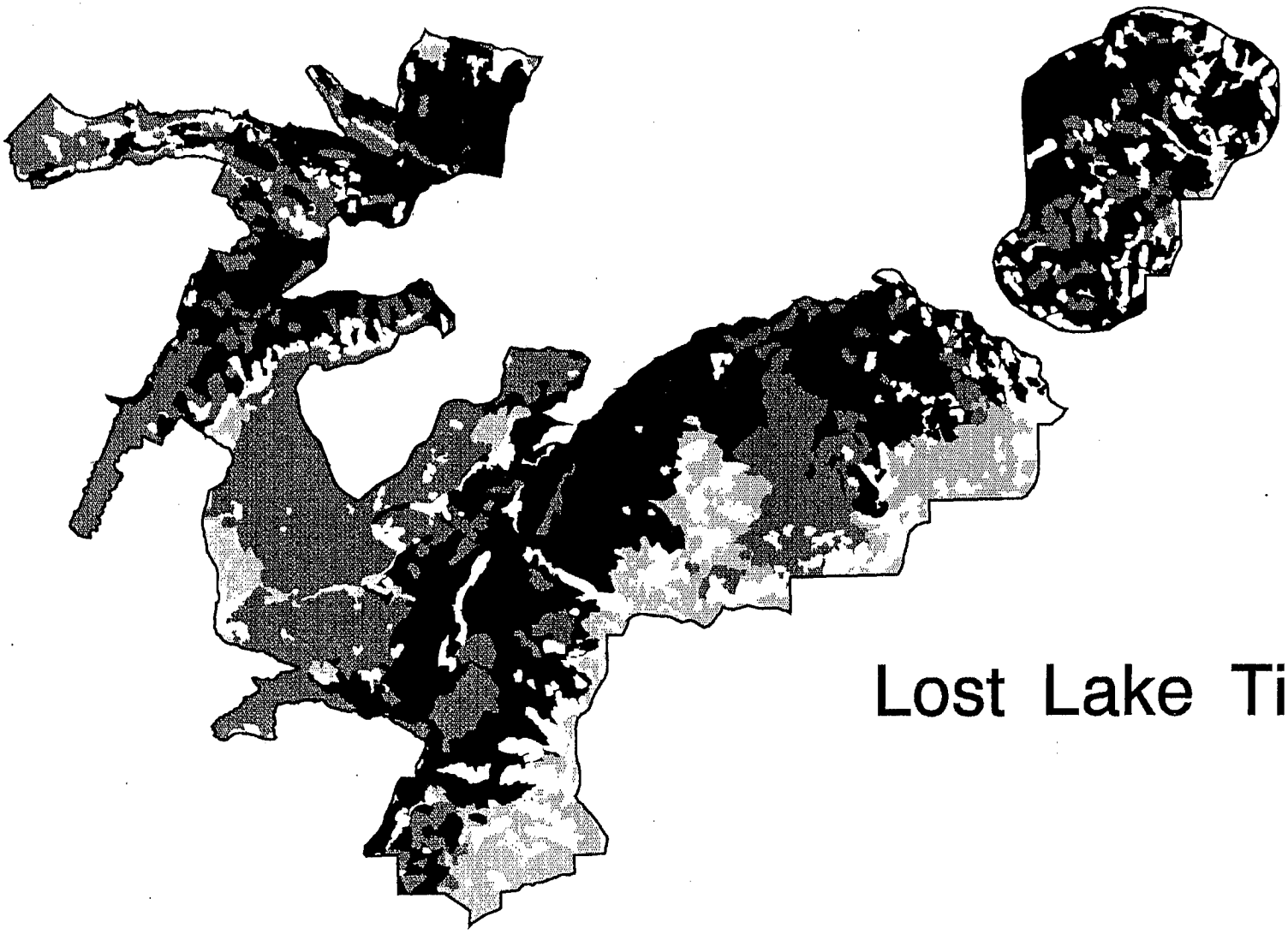


Lost Lake Tieton MLSA

WPBR
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles

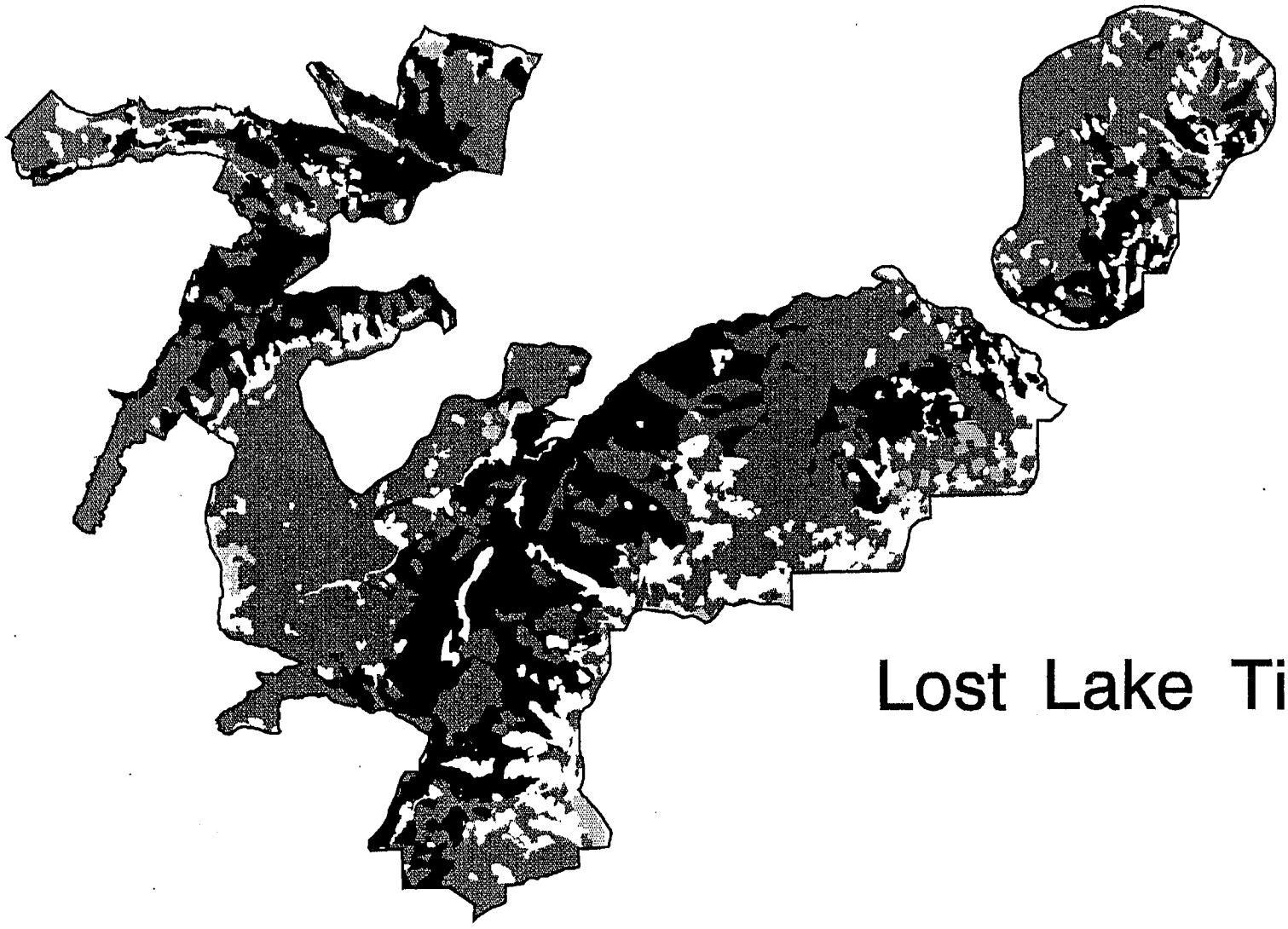


Lost Lake Tieton MLSA

PHWE Root Disease
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles

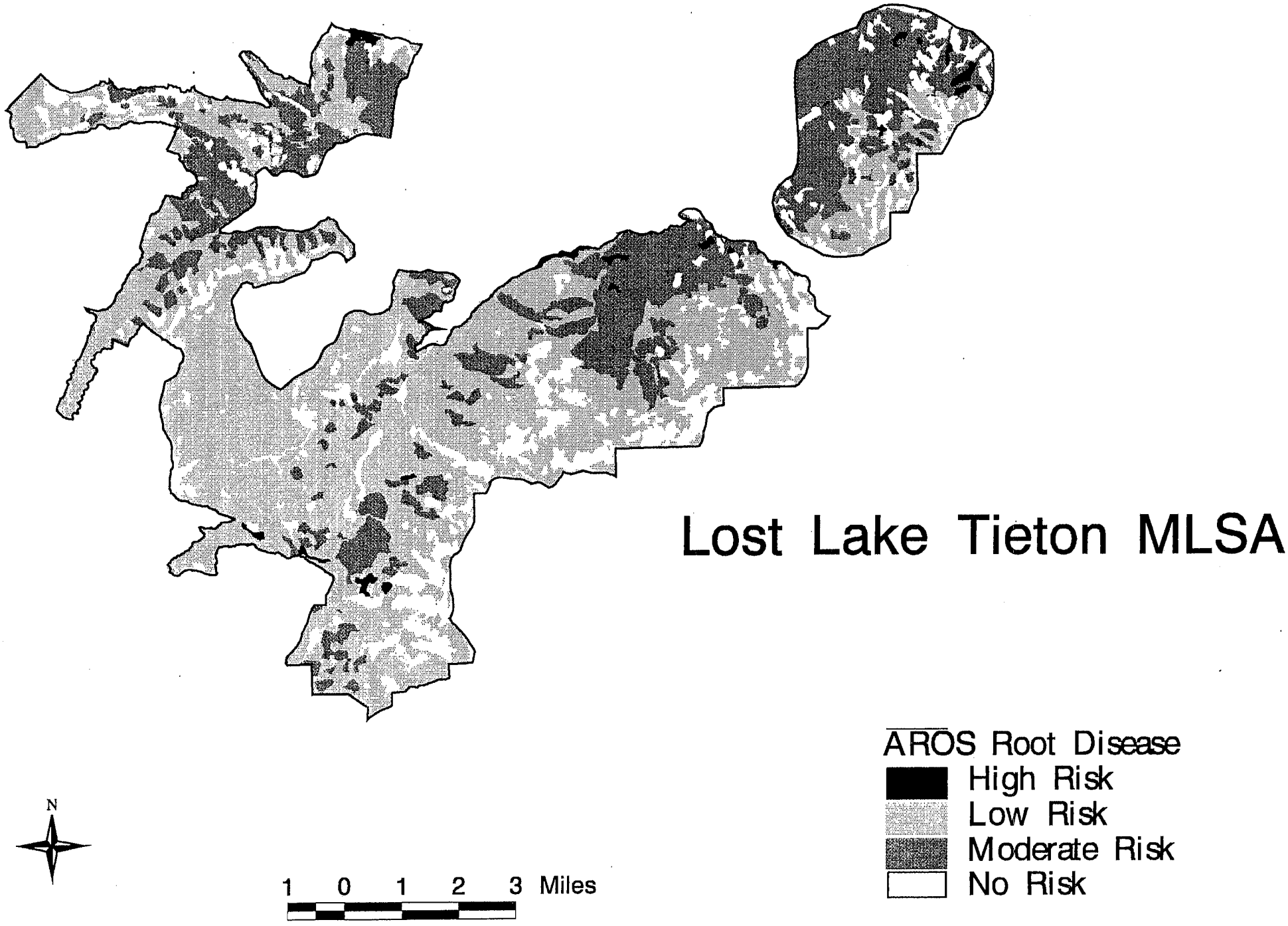


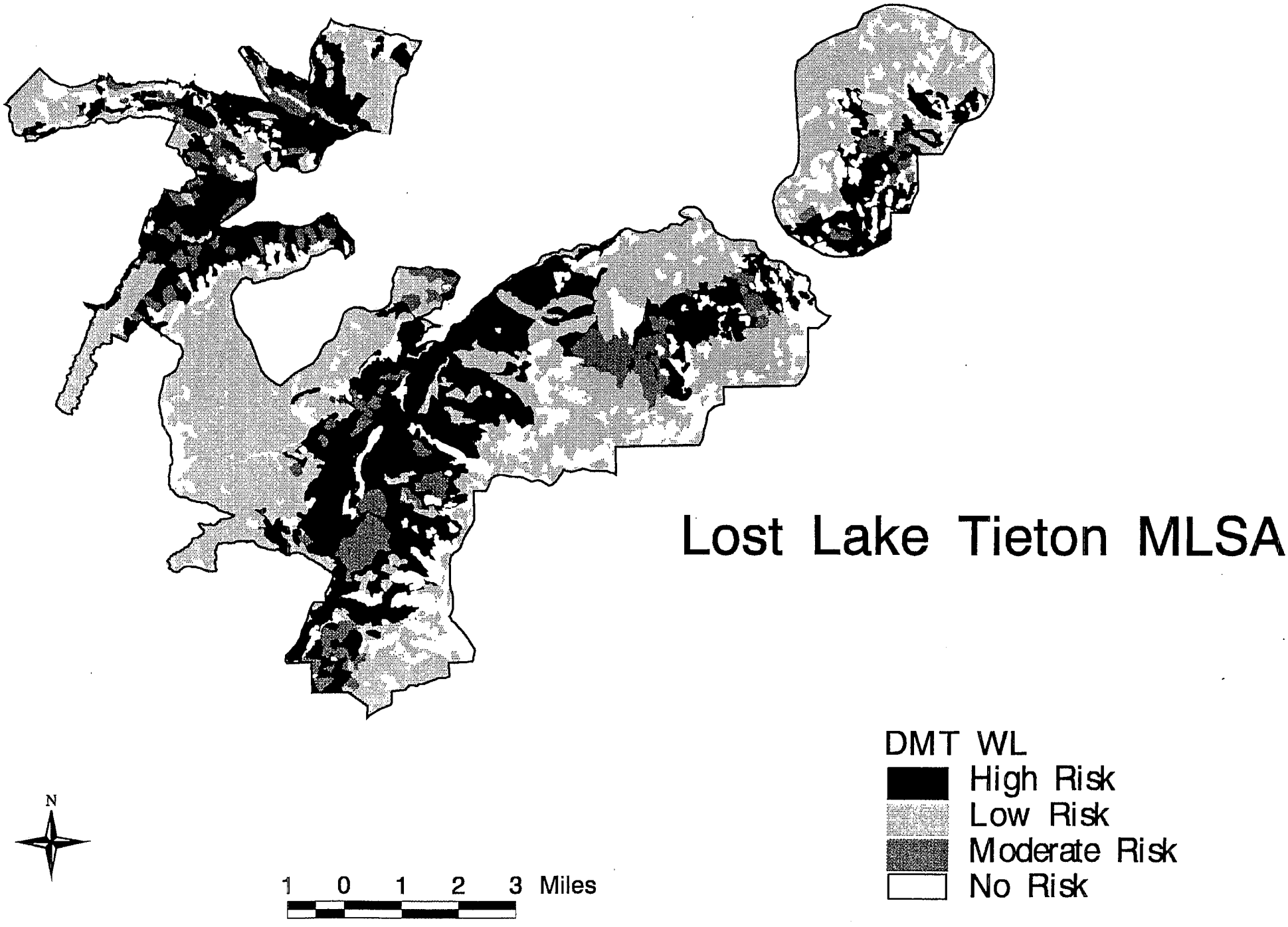
Lost Lake Tieton MLSA

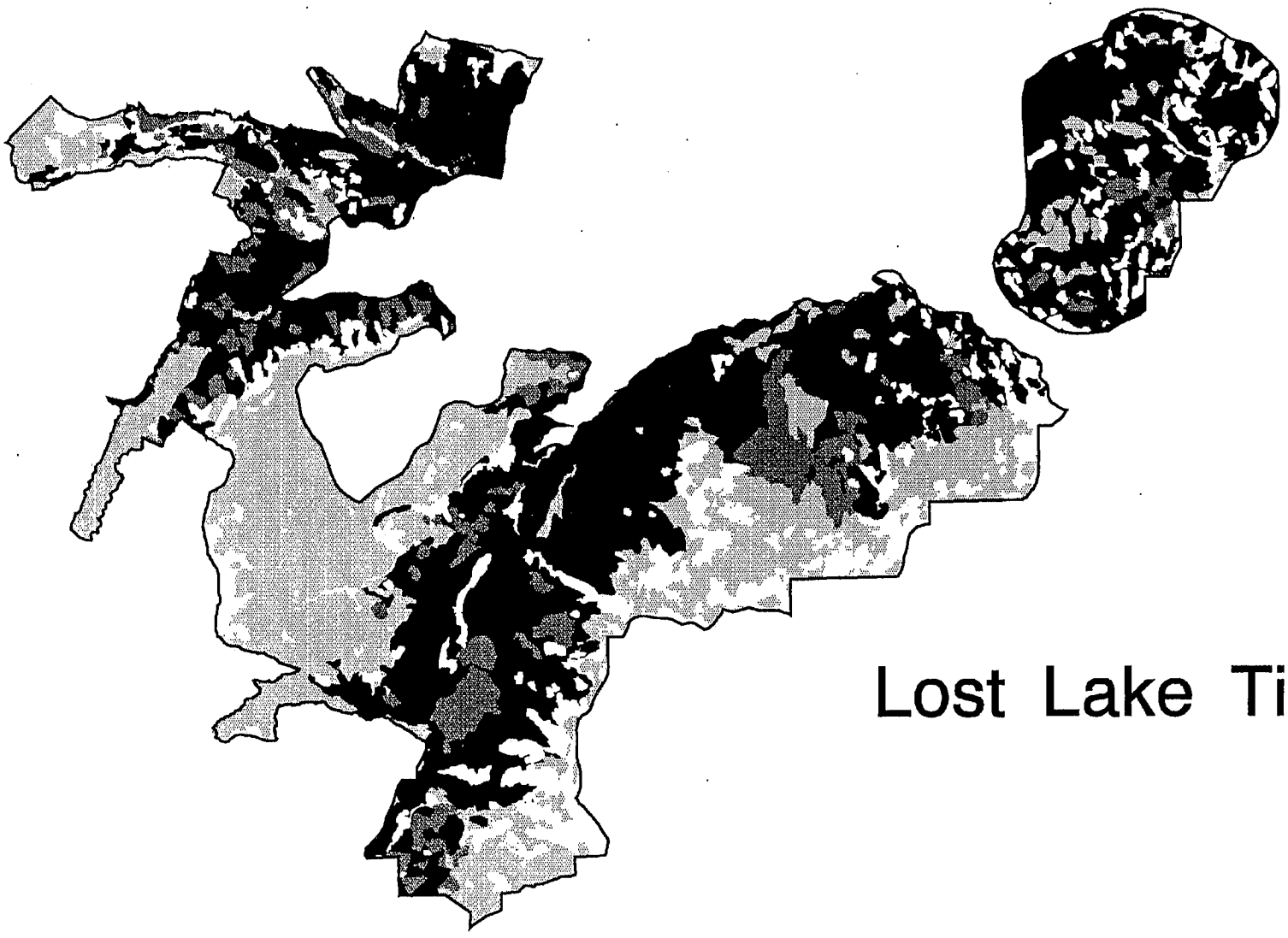
HEAN Root Disease
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles


Lost Lake Tieton MLSA
AROS Root Disease
High Risk
Low Risk
Moderate Risk
No Risk
N
1 0 1 2 3 Miles


Lost Lake Tieton MLSA
DMT WL
High Risk
Low Risk
Moderate Risk
No Risk
N
1 0 1 2 3 Miles

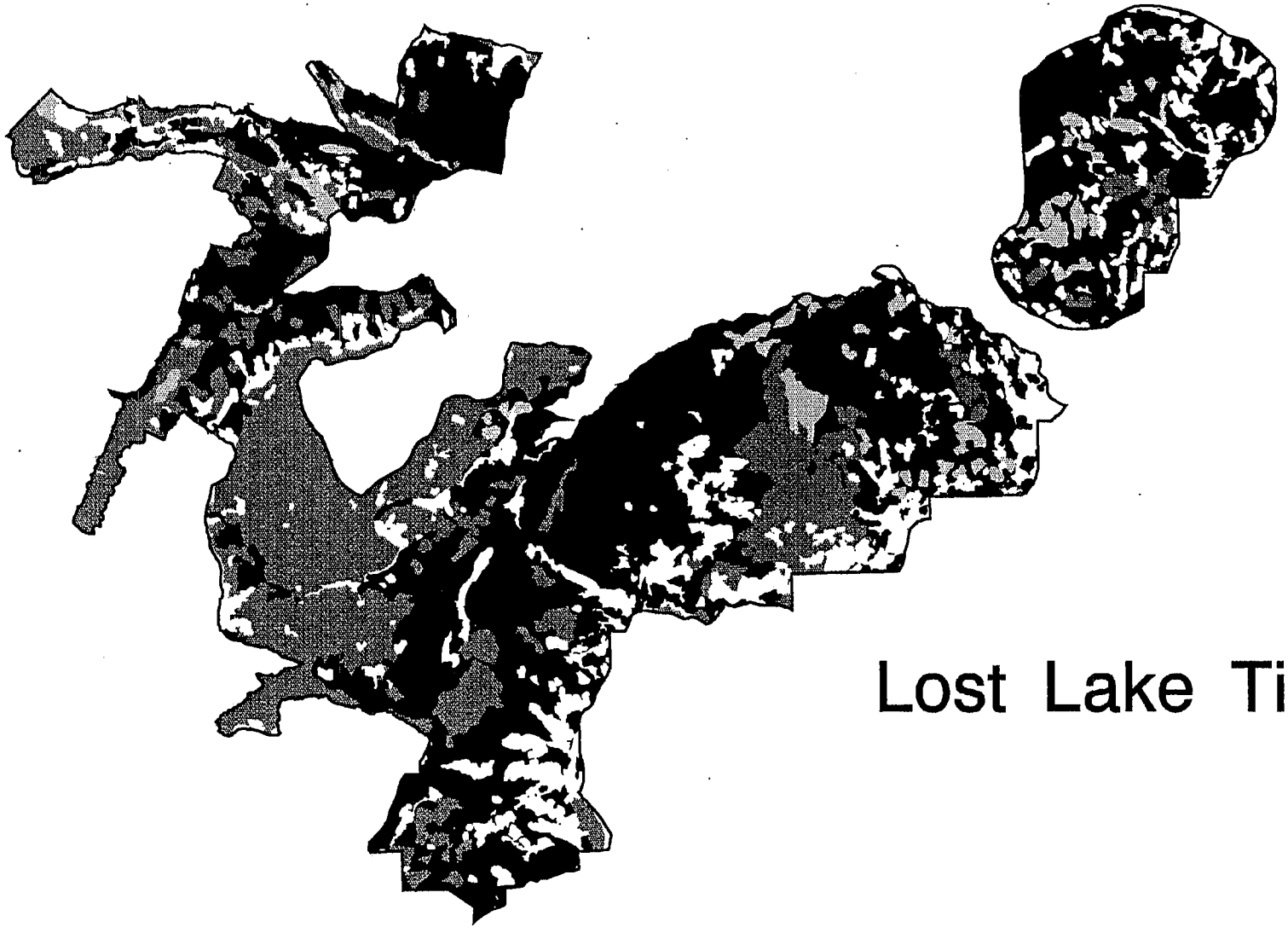


Lost Lake Tieton MLSA

DMT DF
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles

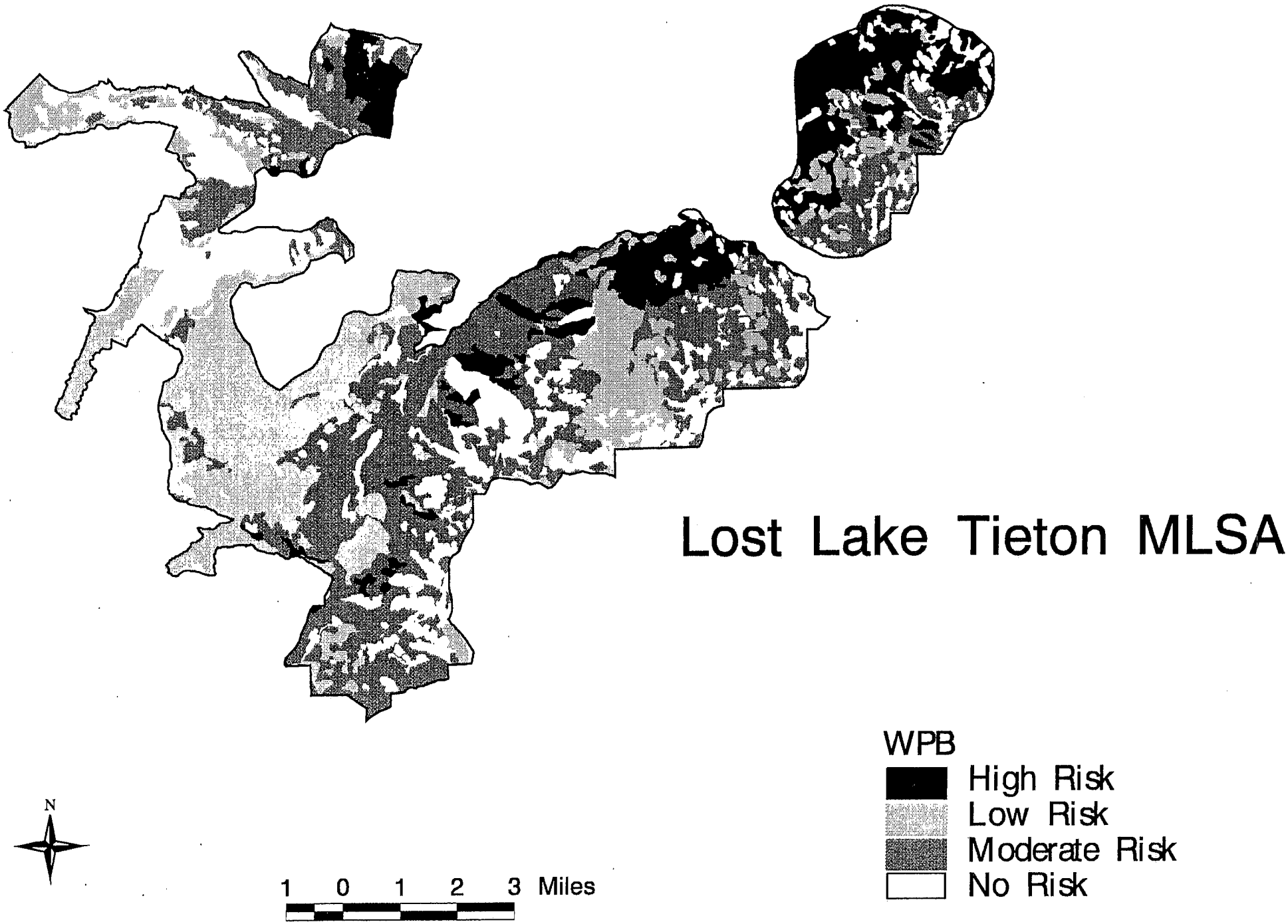


Lost Lake Tieton MLSA

Fire
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

1 0 1 2 3 Miles

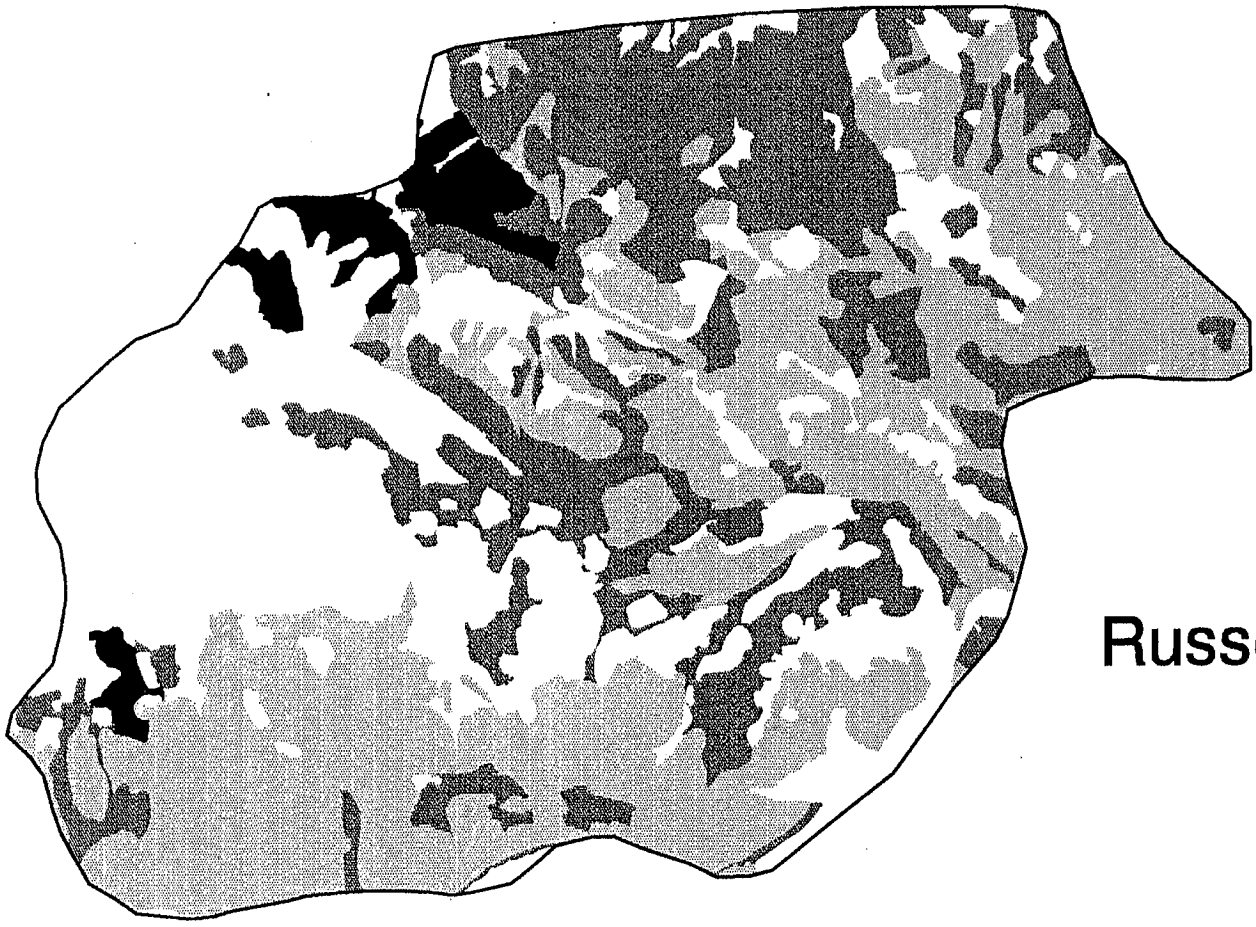

Lost Lake Tieton MLSA
WPB
High Risk
Low Risk
Moderate Risk
No Risk
N
1 0 1 2 3 Miles

Russell Ridge MLSA

Total
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles



Russell Ridge MLSA

MPB
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles

Russell Ridge MLSA

Fir Engraver
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles

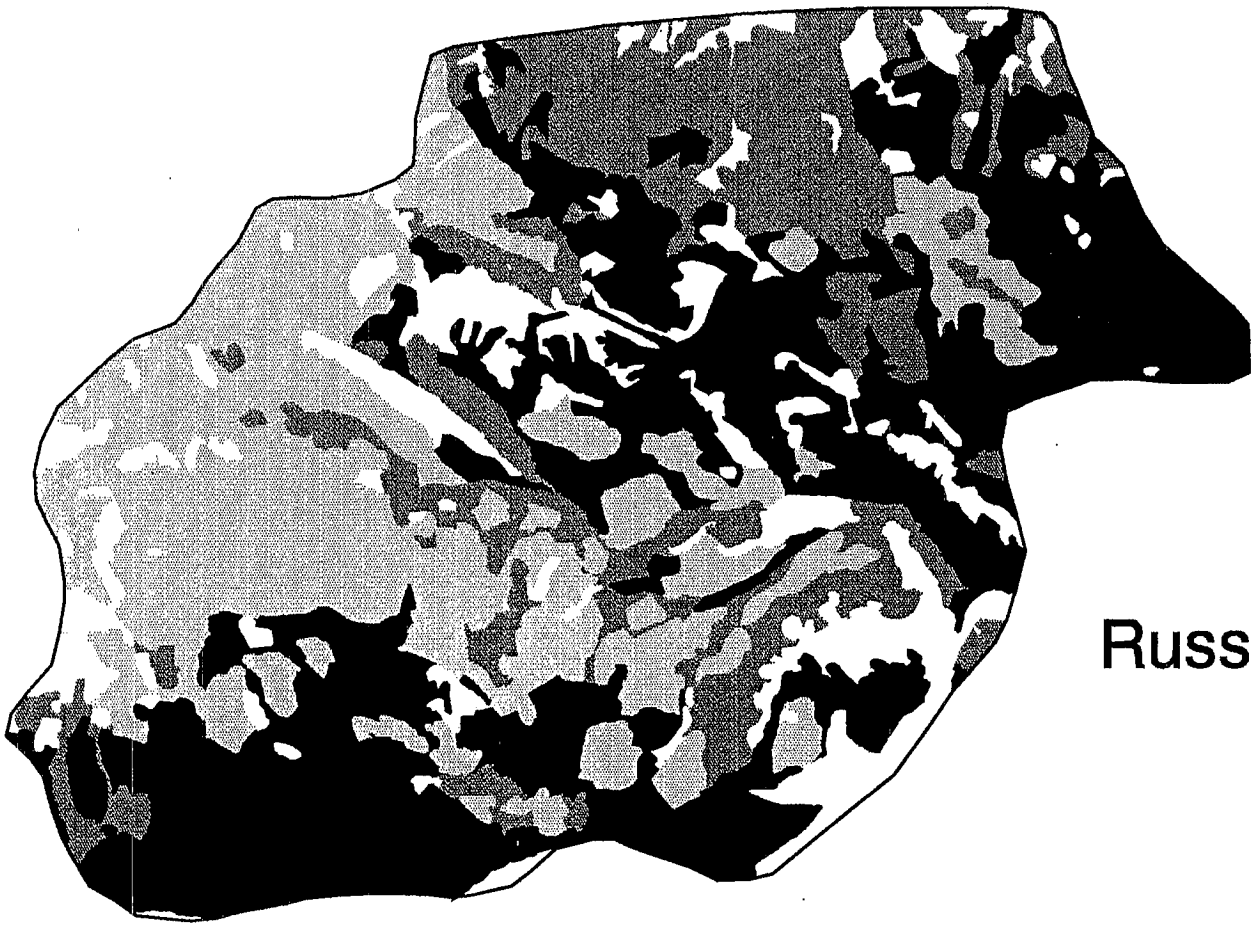
Russell Ridge MLSA

DFB

- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles



Russell Ridge MLSA

WSB
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles

Russell Ridge MLSA

WPBR
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles

Russell Ridge MLSA

PHWE Root Disease
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles

Russell Ridge MLSA

HEAN Root Disease
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

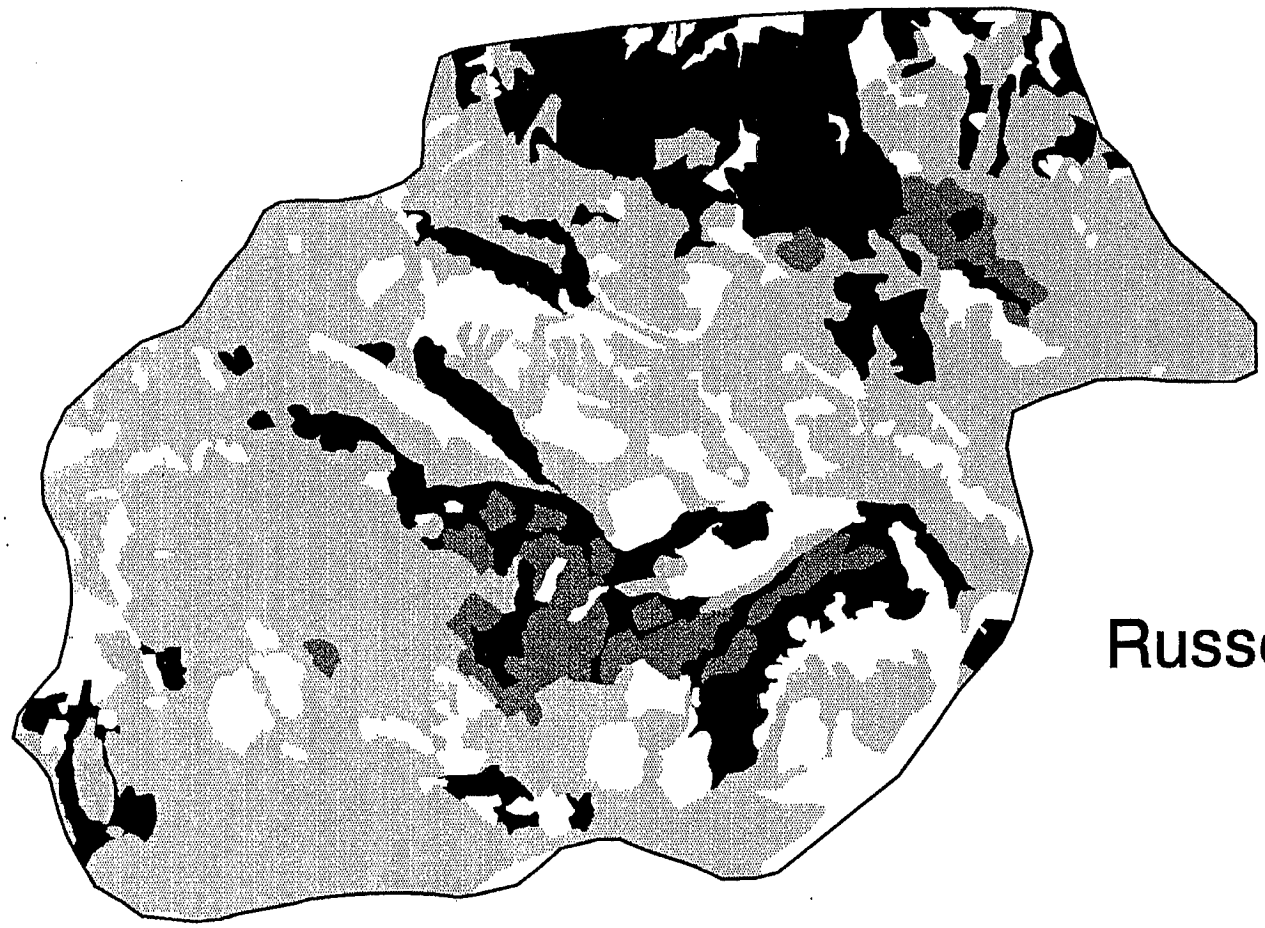
0.5 0 0.5 1 1.5 Miles

Russell Ridge MLSA

AROS Root Disease
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles



Russell Ridge MLSA

DMT WL
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

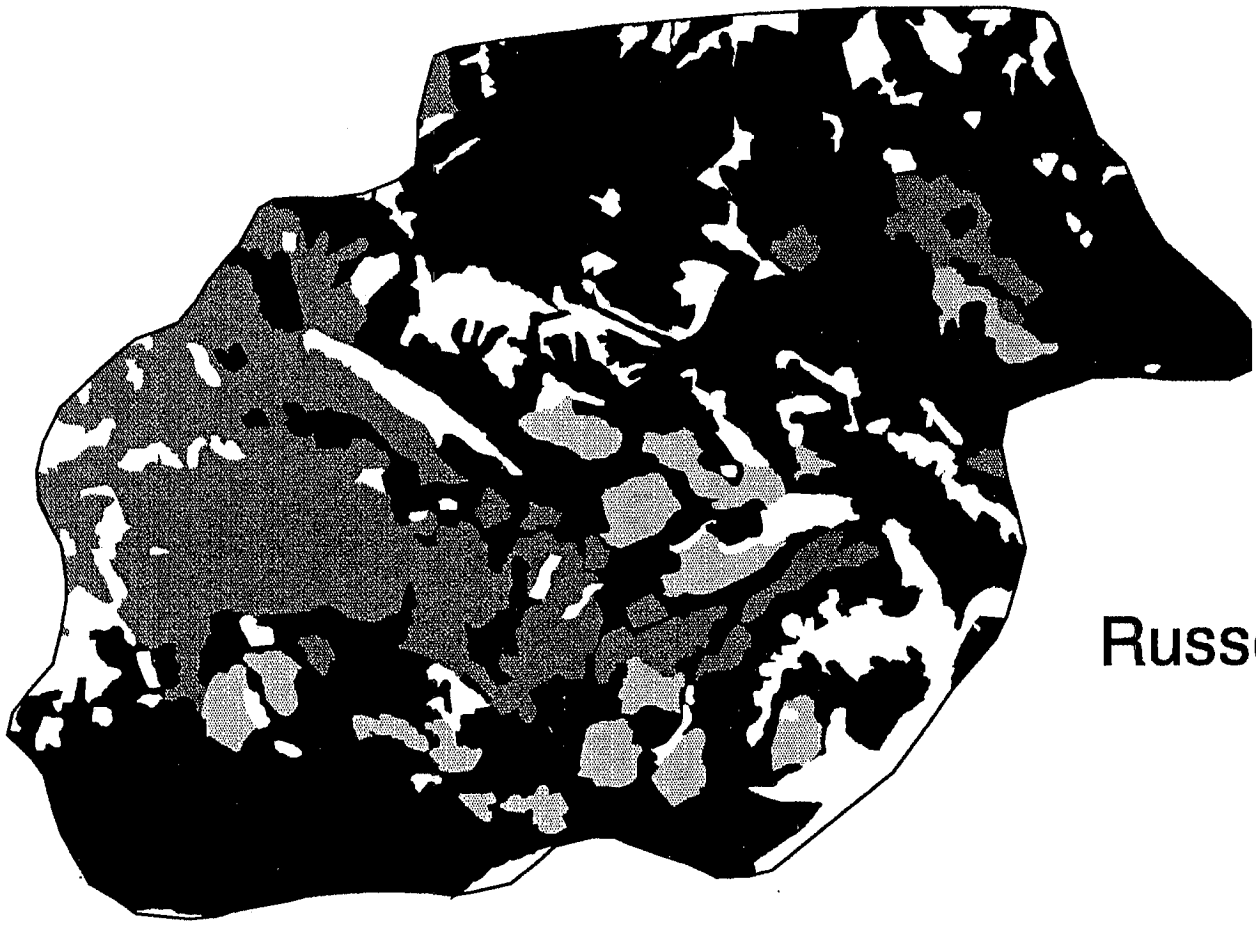
0.5 0 0.5 1 1.5 Miles

Russell Ridge MLSA

DMT DF
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles



Russell Ridge MLSA

Fire
- High Risk
- Low Risk
- Moderate Risk
- No Risk

N

0.5 0 0.5 1 1.5 Miles